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CONTENTS

DISEASES CAUSED BY BACTERIA AND FUNGI, 289-292.

Effect of dryness and humidity on dust and droplet infection in TB., 289; Effect of sensitivity on the distribution of tubercle bacilli, 289; Recovery of the virulence of BCG by passage in g. pigs and syntropy between TB. and F. & M. disease, 289; Characters of *Pfeifferella whitmori* isolated from a case of chronic melioidosis, 289; Biochemical and serological characters of *Pf. whitmori* and *Pseudomonas pyocyanea*, 289; *Listeria monocytogenes* as the cause of septicaemia in foals, 289; An epidemic of tularaemia, 290; Nutrient requirements of *Haemophilus gallinarum*, 290; Growth of bacteria. I. Preliminary observations on *Bact. coli*, 290; Effect of diet, chilling and gastro-intestinal irritation on susceptibility to *Salmonella cholerae-suis*, 290; Infectious abortion in mares in Finland, 291; Report on the control of bovine brucellosis in Norway, 1943, 291; Control of brucella infection by blood testing, 291; Bradsot in Portugal, 291; Distension as a factor in gastro-intestinal disease of herbivores, 291; Titration of *Clostridium welchii* antitoxin, 291; Eperythrozoonosis in cattle and sheep of Louisiana, 291; *Cryptococcus* infection in Equidae, 291; Relationship of *Alternaria tenuis* to canine eczema, 292; Vaccination against bovine and caprine contagious pleuro-pneumonia, 292.

DISEASES CAUSED BY PROTOZOAN PARASITES, 292-294.

Studies on *Trypanosoma equiperdum*, 292; Bovine trichomoniasis in Germany, 292; Intracutaneous and serological reactions to *Trichomonas foetus*, 293; Morphology of trichomonad flagellates in man and in monkeys, cats, dogs, and rats, 293; Bovine coccidiosis: from carrier to clinical case, 293; Bovine coccidiosis in Holland, 293; Experimental infections with *Eimeria bovis* in calves, 293; The respiration of *E. tenella*, 294; Acute lesions produced by *Plasmodium lophurae* in ducks, 294; New mosquito hosts for *P. gallinaceum*, 294; Biliary fever of dogs in East Griqualand, 294; Brain haemorrhage in cattle with *Theileria annulata*, 294; Sarcosporidiosis in sheep, and myositis, 294.

DISEASES CAUSED BY VIRUSES AND RICKETTSIA, 294-295.

Rabies in the white mouse, 294; Efficiency of crystal-violet vaccine on Canadian swine, 294; Vesicular exanthema in swine, 295; Psittacosis in a budgerigar, 295; Interference between murine and monkey poliomyelitis, 295.

IMMUNITY, 295-297.

Synergic activity staphylococcus toxin, 295; Nature and action of staphylococcus coagulase, 296; Immunity in malaria, 296; Passive immunity to poliomyelitis in the chimpanzee, 296; Serologic agglutination of virus-coated bacterial cells, 296; Reaginic allergy in cattle, 297; Hypersensitivity to rabies, 297; Dermatitis in doctors and its aetiology, 297.

PARASITES IN RELATION TO DISEASE [ARTHROPODS], 297-299.

Relationship between temperature and rate of development of insects, 297; Mallophaga parasitic on domestic animals, 297; Key to the larvae of botflies and warble flies in New York State, 297; Tsetse fly operations, Southern Rhodesia, 1943, 297; Plagues of midges in the Lahn Valley, Germany, 298; Live stock losses in Saskatchewan due to blackflies, 298; Demodectic mange in goats, 298.

PARASITES IN RELATION TO DISEASE [HELMINTHS], 298-299.

Survival of helminth ova and protozoan cysts in sewage, 298; Embryonation and survival of eggs of the stomach worm, *Haemonchus contortus*, 298; Nodular worm infestation in sheep, 299.

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS], 299-300.

The tumour-haemorrhage factor in bacteria, 299; Observations on the mitochondria and Golgi material, 299; Mammary carcinoma in mice treated with oestrogen, 299; Experimental mammalian leucaemia, 299; Avian leucosis and lymphomatosis, 300.

DISEASES, GENERAL, 300-302.

Diagnosis of bronchitis and broncho-pneumonia in horses, 300; Granulo-eosinophilic leucocytosis in equine chronic pulmonary emphysema, 300; Sulphur content of the urine of horses with canker of the foot, 300; Periarteritis nodosa in cattle, 300; "White heifer disease", 301; Gastric ulcer in swine, 301; Studies on bloat, 301; Gastro-enteric disease in swine, 301; Allergic-hyperergic necrotic endometritis in sows, 301; Depilation of horses by tannic acid, 301; Inherited shortening of the long bones in the turkey, 302.

NUTRITIONAL AND METABOLIC DISORDERS, 302.

Relation of vitamin D to keel-bone deformity in young chickens; Toxicity of pig liver fatty acids to chicks; Absence of nerve degeneration in chronic thiamine deficiency in pigs; The nutritional significance of inositol.

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY, 302-306.

Changes in fineness, variability, and medullation in hairy lambs, 302; Effect on the milk of water in spring pasture, 303; Relationship between blood components and growth in swine, 303; Blood sugar estimation in cattle, 303; The bone marrow of normal dogs—blood and bone marrow in pyometra, 303; Carotene, vitamin A, and ascorbic acid in mare's plasma, 303; Relationship of copper to haemopoiesis, 303; Copper chloride crystallogram in the horse, 303; Polypeptide N content of the urine of mammals, 304; The rabbit ovulating factor of plant juice, 304; Sex hormones in theory and practice, 304; Sex hormones and the control of the oestrous cycle, 304; Sexual cycle in cattle, 304; Control of ovulation in the cow, 304; Gestation periods of five breeds of cattle, 305; Effect of management at mating on bovine fertility, 305; Uniformity of get in evaluating a sire, 305; Twenty-four hour pregnancy test for equines, 305; Artificial insemination of cattle, 305; Effect of stimulation of the adrenal cortex and of adrenalectomy on circulating erythrocytes and lymphocytes, 306; Histogenesis of the pig neurohypophysis, 306; Distribution of the horn tubules and middle horn in different forms of the hoof in horses, 306.

POISONS AND POISONING, **306-307.**

Arsenic poisoning in swine, **306**; Influence of arsenic on selenium poisoning in hogs, **306**; Growth of steers on seleniferous range, **306**; Isolation of glutathione and thioneine from the blood of selenized steers, **306**; Formation and disappearance of methaemoglobin following administration of sodium nitrite, **306**; Nicotine poisoning in lambs, **307.**

PHARMACOLOGY, THERAPEUTICS AND DISINFECTION, **307-311.**

Epinephrine and tissue permeability, **307**; Streptomycin, **307**; Control of Gram-negative bacteria by streptomycin, **307**; An antibiotic from *Crepis taraxacifolia*, **307**; Chemotherapy with azo and sulphonamide compounds, **307**; Antisulphonamide action of *p*-aminobenzoic acid, **307**; Sulphonamides in veterinary practice, **307**; Examination and treatment of mastitis in the ambulatory clinic, **308**; Treatment of bovine mastitis with sulphathiazole, **308**; Treatment of glanders with sulphathiazole, **308**; Action on the salmonella and coliform bacteria of salicyl-azo-sulphapyridine, **308**; Studies on porcine enteritis. 1. Sulphathalidine therapy, **308**; Action of antibiotics on organisms producing gas gangrene, **308**; Chemotherapy in experimental TB., **309**; Treatment of trypanosomiasis by pentamidine, **309**; Prophylactic effect of sulphadiazine and sulphaguanidine against *Plasmodium gallinaceum* infection, **309**; Sulphur prophylaxis of coccidiosis of lambs, **309**; Control of avian coccidiosis, **309**; Sulphonamide therapy of caecal coccidiosis, **310**; Vinegar in the control of coccidiosis, **310**; Treatment of rabbit spirochaetosis, **310**; Penicillin in the treatment of ornithosis, **310**; Effect of enzyme inhibitors and activators on rickettsia, **310**; Control of flies in animal houses, **310**; Cattle dipping in Argentina, **310**; Control of strongyle infestation in horses, **311**; Treatment of canine neoplasms by stilboestrol, **311**; Treatment of joint injuries with prontosil, **311**; Dissolution of urinary calculi, **311**; Treatment of infected wounds with sulphonamides, **311.**

HYGIENE, PUBLIC HEALTH AND VETERINARY SERVICES, **311-312.**

Current questions of milk supply, **311**; Milk control in Oslo, **312**; Advisory dairy bacteriologists, **312**; Cell contents of milk, **312**; Presence in raw cow's milk of a bactericidal substance for coliform organisms, **312**; TB. meningitis in relation to infection from milk, **312**; Cheese carrying typhoid in Alberta ? **312**; Changes in beef during storage, **312.**

TECHNIQUE AND APPARATUS, **313.**

Ribonucleic acid and the Gram stain.

MISCELLANEOUS, **313.**

Japanese animal treatment; Management of an artificial breeding circuit.

REPORTS, **313-315.**

Great Britain. Pharmaceutical Society of Great Britain. Report of research work, 1943, **313**; Committee reports of the American Veterinary Medical Association, 1944, **313**; Connecticut State Entomologist, Report, 1942, **315**; Laboratories and sero-vaccination centres in French West Africa, 1942, **315.**

BOOK REVIEWS, **316.**

Clinical diagnosis by laboratory examinations [Kolmer]; Biochemistry of the fatty acids and their compounds, the lipoids [Bloor]; Physical biochemistry [Bull].

INDEX TO AUTHORS

ANON., 312.

Akucs, L., 304.
Allen, E. A., 310.
Allen, T., 292.
Anderson, H. D., & Moxon, A. L., 306.
—. See also Jensen, C. W., jt. author, 306.
—. See also Moxon, A. L., et al., jt. authors, 306.
Asmundson, V. S., 302.

Bailly, J. See Remlinger, P., jt. author, 294.
Baker, D. W., & Dalmat, H. T., 297.
Balás, G., 301.
Barboni, E., 294.
Barkworth, H., 312.
Bartholomew, J. W., & Umbreit, W. W., 313.
Bartlett, S., & Mackintosh, J., 305.
Beamer, P. D. See Graham, R., et al., jt. authors, 308.
Bee, U. G. See Livesay, E. A., jt. author, 305.
Beller, K., 289.
Belonje, C. W. A., 294.
Bennett, S. C. J., 291.
Berg, O. A., 303.
Berry, H., 313.
Bhattacharya, P. See Hammond, J., Jr., jt. author, 304.
Blagoveshchenskii, D. I., 297.
Blanc, G., Delage, B., & Martin, L. A., 289.
Bloom, F., 303.
—. See also Meyer, L. M., jt. author, 303.
Bloor, W. R., 316.
Bodian, D. See Howe, H. A., jt. author, 296.
Bornand, M., 292.
Borrøe, R., 304.
Boughton, D. C., 293.
Bowman, G. W. See Hammond, D. M., et al., jt. authors, 293.
Boyd, W. L., 301.
Bradbury, J. T., 304.
Britton, J. W., 291.
Brosius, W. L., & Woodruff, C. E., 289.
Bugie, E. See Schatz, A., et al., jt. authors, 307.
Bull, H. B., 316.
Burns, E. L. See Loeb, L., et al., jt. authors, 299.

Cantrell, W., & Jordan, H. B., 294.
Chorley, J. K., 297.
Christensen, J. F., 309.
Coatney, G. R., & Cooper, W. C., 309.
Cole, C. L. See Rasmussen, R. A., et al., jt. authors, 303.
Cole, H. H. See Mead, S. W., et al., jt. authors, 301.
Coles, J. D. W. A., 295.
Comstock, R. E. See Nordskog, A. W., et al., jt. authors, 303.
Cooper, W. C. See Coatney, G. R., jt. author, 309.
Cram, E. B., 298.
Crawshaw, H. A., 307.
Cugnini, I., 308.

Dalmat, H. T. See Baker, D. W., jt. author, 297.
Dalton, A. J., & Earle, W. R., 299.
Dam, H., 302.
Davidson, J., 297.
Davis, L. R. See Hammond, D. M., et al., jt. authors, 293.
Dean, D. J. See Griffin, C. A., jt. author, 298.
Delage, B. See Blanc, G., et al., jt. authors, 289.
Domagk, G., 311.
Doorme, H. See Willems, A. E. R., jt. author, 293.
Dougherty, T. F. See White, A., jt. author, 305.
Duran-Jorda F., 312.

Earle, W. R. See Dalton, A. J., jt. author, 299.
Ebbell, H., 309.
Eigendorf, 298.
Elvehjem, C. A. See Maass, A. R., et al., jt. authors, 303.
Erdmann, B. See Schuller, A., jt. author, 290.

Filipović, S., 303.
Finlayson, M. H., 289.
Follis, R. H., Jr. See Wintrobe, M. M., et al., jt. authors, 302.
Forck, F., 292.
French W. Africa. Wk Lab. Sero-Vaccin. Cent., 1942, 315.
Friend, R. B., 315.
Fuller, H. K., 313.

Graham, R., Peterson, E. H., Morrill, C. C., Hardenbrook, H. J., Whitmore, G. E., & Beamer, P. D., 308.
Gratzl, E., 300.
Gt Britain. Rep. Coll. pharm. Soc., 1942–43, 313.
Greene, H. R., 308.
Gregory, D. W., 290.
Greiff, D., Pinkerton, H., & Moragues, V., 310.
Griffin, C. A., & Dean, D. J., 298.
Grini, O., 289.
Gwatkin, R., & Moynihan, I. W., 290.
—. See also Mitchell, C. A., jt. author, 294.

Hale, J. H. See Smith, W., jt. author, 296.
Hammond, D. M., Davis, L. R., & Bowman, G. W., 293.
Hammond, J., Jr., & Bhattacharya, P., 304.
Hamre, D. M. See McKee, C. M., et al., jt. authors, 308.
Hardenbrook, H. J. See Graham, R., et al., jt. authors, 308.
Hart, E. B. See Maass, A. R., et al., jt. authors, 303.
Hazel, L. N. See Pohle, E. M., et al., jt. authors, 302.
Heatley, N. G., 307.
Heilman, F. R., & Herrell, W. E., 310.
Herrell, W. E. See Heilman, F. R., jt. author, 310.
Herrick, C. A. See Smith, B. F., jt. author, 293.
Hillesund, C. M., 312.
Holden, J. R. See Saunders, G. F. T., et al., jt. authors, 309.
Homburger, F., 307.
Howe, H. A., & Bodian, D., 296.
Hughes, M. H. See Saunders, G. F. T., et al., jt. authors, 309.
Hulin, P., 292.
Humphreys, S. See Wintrobe, M. M., et al., jt. authors, 302.
Hutner, S. H. See Zahl, P. A., et al., jt. authors, 299.

Jacobs, S. E. See Jordan, R. C., jt. author, 290.
Jansch, H., & Langmantel, H., 300.
Jensen, C. W., & Anderson, H. D., 306.
Jensen, R., 291.
Ježić, J., & Kodrnja, E., 297.
Johnson, L. E., 305.
Johnson, S. R., & Smith, R. M., 302.
Jones, D., Metzger, H. J., Schatz, A., & Waksman, S. A., 307.
Jordan, H. B. See Cantrell, W., jt. author, 294.
Jordan, R. C., & Jacobs, S. E., 290.
Jungeblut, C. W., 295.
—, & Sanders, M., 295.

Kästli, P., 308.
Keller, H. R. See Pohle, E. M., et al., jt. authors, 302.
Kernkamp, H. C. H., 301, *bis*.
Kirschbaum, A., 299.
Klarer, J. See Mietzsch, F., jt. author, 307.
Knudsen, M., 291.
Kodrnja, E. See Ježić, J., jt. author, 297.
Kolmer, J. A., 316.
Kovács, E., 306.

Laing, J. A., 305.
Langmantel, H. See Jansch, H., jt. author, 300.
Lauristen, M. See Wintrobe, M. M., et al., jt. authors, 302.
Lee, A. M., Scrivner, L. H., & North, M. O., 300.
Lelanne, A., 292.
Levaditi, C., Mentzer, C., & Périault, R., 307.
Livesay, E. A., & Bee, U. G., 305.
Loeb, L., Suntzeff, V., Burns, E. L., & Schenken, I. R., 299.
Lowe, B. See Paul, P., et al., jt. authors, 312.

Maass, A. R., Michaud, L., Spector, H., Elvehjem, C. A., & Hart, E. B., 303.
McAuliff, J., 308.
McClurg, B. R. See Paul, P., et al., jt. authors, 312.
Macke, E. A., 310.
McKee, C. M., Hamre, D. M., & Rake, G., 308.
Mackinnon, M. N., 313.
Mackintosh, J. See Bartlett, S., jt. author, 305.
Marsh, H. C., 295.
Martin, L. A. See Blanc, G., et al., jt. authors, 289.
Mead, S. W., Cole, H. H., & Regan, W. M., 301.
Melville, K. I., & Stehle, R. L., 309.
Mentzer, C. See Levaditi, C., et al., jt. authors, 307.
Metzger, H. J. See Jones, D., et al., jt. authors, 307.
Meyer, L. M., & Bloom, F., 303.
Michaud, L. See Maass, A. R., et al., jt. authors, 303.
Mietzsch, F., & Klarer, J., 307.
Millar, J. L., & Rempel, J. G., 298.
Miller, M. J. See Rasmussen, R. A., et al., jt. authors, 303.
Milne, R. L. See Williams, E. M., jt. author, 312.
Mitchell, C. A., & Gwatkin, R., 294.
Moragues, V. See Greiff, D., et al., jt. authors, 310.
Morrill, C. C. See Graham, R., et al., jt. authors, 308.
Morris, C. S., 312.
Moxon, A. L., 306.
—, Rhian, M. A., Anderson, H. D., & Olson, O. E., 306.
—. See also Anderson, H. D., jt. author, 306.
Moynihan, I. W. See Gwatkin, R., jt. author, 290.
Muntiu, N., 308.

Nordskog, A. W., Comstock, R. E., & Winters, L. M., 303.
North, M. O. See Lee, A. M., et al., jt. authors, 300.
Norway. Rep. vet. Dir. Contr. bov. Brucellosis, 1943, 291.

Olson, O. E. See Moxon, A. L., et al., jt. authors, 306.

Palmeiro, J. M., 291.
Paul, P., Lowe, B., & McClurg, B. R., 312.
Pauli, C., 310.
Périault, R. See Levaditi, C., et al., jt. authors, 307.
Peterson, E. H. See Graham, R., et al., jt. authors, 308.
Pinkerton, H. See Greiff, D., et al., jt. authors, 310.
Pohle, E. M., Keller, H. R., & Hazel, L. N., 302.

Rake, G. See McKee, C. M., et al., jt. authors, 308.
Rasmussen, R. A., Cole, C. L., & Miller, M. J., 303.
Reddin, L., Jr., 297.
Regan, W. M. See Mead, S. W., et al., jt. authors, 301.
Remlinger, P., & Bailly, J., 294.
Rempel, J. G. See Millar, J. L., jt. author, 298.
Rhian, M. A. See Moxon, A. L., et al., jt. authors, 306.
Rigdon, R. H., 294.
Roberts, E. C., 296.
Roberts, S. J., 308.
Robertson, A., 304.
Rössner, G., 306.

Sanders, M. See Jungeblut, C. W., jt. author, 295.
Sarles, M. P., 299.
Saunders, G. F. T., 309.
—, Holden, J. R., & Hughes, M. H., 309.
Savage, W., 311.
Schatz, A., Bugie, E., & Waksman, S. A., 307.
—. See also Jones, D. et al., jt. authors, 307.
Schenken, I. R. See Loeb, L., et al., jt. authors, 299.
Schlaak, 311.
Schmid, G., 310.
Schmidt, S., 296.
Schmidt, W., 297.
Schoening, H. W. See Traum, J., jt. author, 295.
Schöneswetter, H., 303.
Schuller, A., & Erdmann, B., 290.
Scriver, L. H. See Lee, A. M., et al., jt. authors, 300.
Seren, E., 300.
Shanklin, W. M., 306.
Shorb, D. A., 298.
Smith, B. F., & Herrick, C. A., 293.
Smith, R. M. See Johnson, S. R., jt. author, 302.
Smith, W., & Hale, J. H., 296.
Smythe, R. H., 311.
Soós, A., 304.
Spector, H. See Maass, A. R., et al., jt. authors, 303.
Stableforth, A. W., 307.
Starr, M. P. See Zahl, P. A., et al., jt. authors, 299.
Stehle, R. L. See Melville, K. I., jt. author, 309.
Stein, H. See Wintrobe, M. M., et al., jt. authors, 302.
Stenius, 291.
Stewart, S. E., 291.
Streich, W., 301.
Suby, H. I., 311.
Sulman, F. See Zondek, B., jt. author, 305.
Suntzeff, V. See Loeb, L., et al., jt. authors, 299.
Svec, M. H., 293.
Swales, W. E., 310.

Taliaferro, W. H., 296.
Thomas, A. D., 294.
Thorp, W. T. S., 307.
Traum, J., & Schoening, H. W., 295.
Trillat, A., 289.

Umbreit, W. W. See Bartholomew, J. W., jt. author, 313.
U.S.A. Comm. Reps., A.V.M.A., 1944, 313–315.
—. Rep. Conn. St. Entomologist, 1942, 315.

Waksman, S. A. See Jones, D., et al., jt. authors, 307.
—. See also Schatz, A., et al., jt. authors, 307.
Wenrich, D. H., 293.
White, A., & Dougherty, T. F., 305.
Whitmore, G. E. See Graham, R., et al., jt. authors, 308.
Wickware, A. B., 300.
Wiesmann, R., 310.
Willems, A. E. R., & Doorme, H., 293.
Williams, E. M., & Milne, R. L., 312.
Winters, L. M. See Nordskog, A. W., et al., jt. authors, 303.
Wintrobe, M. M., Follis, R. H., Jr., Humphreys, S., Stein, H., & Lauristen, M., 302.
Woodruff, C. E. See Brosius, W. L., jt. author, 289.
Woolley, D. W., 302.

Zahl, P. A., Starr, M. P., & Hutner, S. H., 299.
Zondek, B., & Sulman, F., 305.

REVIEW ARTICLES

(1) "The Present Position of Phenothiazine as an Anthelmintic".

(2) "Trichomoniasis—A Review of Recent Literature".

Reprints (price 1/6 and 2/6 respectively) obtainable from: Central Sales Branch (Imperial Agricultural Bureaux), Penglais, Aberystwyth.

The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin*.

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

Books for Review.

The Editor will be glad to receive books for review in the *Veterinary Bulletin*.

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

A list of annotations and reviews, classified according to subject, is now given in *Index Veterinarius*, being inserted at the end of each number. Such papers will not necessarily be dealt with in the *Veterinary Bulletin*.

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DISEASES CAUSED BY BACTERIA AND FUNGI

TRILLAT, A. (1941). Sur la contagiosité des poussières tuberculeuses sèches ou humides a l'état de gouttelettes salivaires. [**Effect of dryness and humidity on dust and droplet infection in tuberculosis.**]—*Arch. Inst. Pasteur Algér.* **19.** 1–15. **1756**

A distinction is drawn between the infectivity of dry and moist particles carrying *Mycobacterium tuberculosis*. Most attempts to cause an inhalation infection in experimental animals with artificially dried bacilli or dried infective secretions, *e.g.* sputum, have failed, whereas fine particles expelled by infective persons during coughing, etc., are highly dangerous. T. explains this difference on the grounds that dried particles are incapable of remaining suspended in the air and are so large that they are easily trapped in the upper respiratory tract, whereas droplet nuclei which may be 5μ or less in diameter, are capable of rolling over both moist and dry surfaces.

Experiments are described [no details] on the projection of an aerosol mist of tuberculous saliva and on the activity of antiseptic mists in destroying the bacilli. The effects of temperature, humidity and barometric pressure on the physical changes in droplet nuclei are also discussed. There is a useful summary of the earlier literature on this subject.—R. E. GLOVER.

BROSIUS, W. L., & WOODRUFF, C. E. (1944). **The effect of sensitivity on the distribution of tubercle bacilli in tuberculosis.**—*Amer. Rev. Tuberc.* **50.** 473–480. [Spanish summary.] [Authors' English summary copied *verbatim*.] **1757**

Tuberculous lesions in the lungs of patients who are highly sensitized at the time of death contain few or no acid-fast bacilli, except in areas of necrosis separated by an avascular barrier. On the other hand, in patients who have lost more or less completely their ability to respond to tuberculin, pulmonary lesions teeming with tubercle bacilli are found. When tubercle bacilli are present in large numbers in living tissue, the level of sensitivity is low. Living tubercle bacilli and tissues of high sensitivity are incompatible. The reason why the highly sensitized patient may have tubercle bacilli in his sputum is that bacilli growing on the necrotic lining of a pulmonary cavity have been *exteriorized* as far as the sensitivity factors of the body are concerned.

BELLER, K. (1942). Wiedererlangung der Virulenz von BCG-Kulturen durch Meerschweinchenpassagen, zugleich ein Beitrag zur Syntropie zwischen Tuberkulose und Maul- und Klauenseuche. [**Recovery of the virulence of BCG culture by passage in guinea pigs and also observations on syntropy between tuberculosis and foot and mouth disease.**]—*Z. InfektKr. Haustiere.* **59.** 25–31. **1758**

The majority of the g. pigs used for these experiments had already served for research on F. & M. disease. Although the history of individual animals was not recorded, it is believed that earlier infection with F. & M. disease favours generalization following BCG inoculation. Four passages of BCG were made. The numbers of g. pigs showing generalized lesions following these inoculations in each passage was as follows: 1st passage, none out of 232, 2nd passage, 18 out of 122, 3rd passage, 15 out of 19, 4th passage, 2 out of 3.—J. B. BROOKSBY.

FINLAYSON, M. H. (1944). **Some characters exhibited by a strain of *P. whitmori* isolated from a case of chronic melioidosis.**—*S. Afr. med. J.* **18.** 113–114. **1759**

The strain of *Pfeifferella whitmori* described was isolated in South Africa from a case of chronic melioidosis acquired in the Middle East. Two variants were obtained, one rough and the other smooth. It was found that acid-fast granules were present in the rough variant in the earlier cultures. These granules were less frequent in the smooth variant. The cultural characters are described in detail. Both forms were virulent for laboratory animals and for several species of wild rodents. It was not found possible to immunize laboratory animals against the organisms. Both forms contained large-flake antigen but it was not found possible to demonstrate the presence of O antigen.
—E. M. ROBINSON.

BLANC, G., DELAGE, B., & MARTIN, L. A. (1943). Etude comparative de caractères biochimiques et sérologiques du bacille de Whitmore et du bacille pyocyanique. [**Comparative study of the biochemical and serological characters of *Pfeifferella whitmori* and *Pseudomonas pyocyanea*.**]—*Ann. Inst. Pasteur.* **69.** 65–74. **1760**

A close affinity between *Pfeifferella whitmori* and *Pseudomonas pyocyanea* had been reported by LEGROUSE and his collaborators [see *V. B.* **15.** 72].

This article records the results of a comparison of several strains of *Ps. pyocyanea* with a strain of *Pf. whitmori*. Some strains of *Ps. pyocyanea*, especially the authors' strain "Flu", closely resemble *Pf. whitmori*.
—M. C.

GRINI, O. (1943). Listerella monocytogenes som årsak til septico-pyemi hos føll. [*Listeria monocytogenes* **as the cause of septicaemia in foals.**]—*Norsk VetTidsskr.* **55.** 97–104. [English and German summaries.] **1761**

This is believed to be the first record of listeriasis in the horse. The organism was recovered from the liver, spleen and kidneys of a foal which died six days

after birth. It had shown only diarrhoea and slight haemorrhage from the navel before death. The only P.M. lesion was a swollen liver containing numerous necrotic centres.

The organism was subjected to detailed bacteriological study including reaction with 22 fermentable substances. It behaved in all respects like *Listeria monocytogenes*, but was of a very low virulence for rabbits, causing only severe monocytosis. Identification was verified serologically in comparison with two other strains of *L. monocytogenes*, isolated from a sheep and a capercailye.—J. E.

SCHULLER, A., & ERDMANN, B. (1943). Beobachtungen bei einer Tularämie-Epidemie. [**An epidemic of tularaemia.**]—*Z. Hyg. InfektKr.* **124.** 624–635. **1762**

Observations on an outbreak of human tularaemia in a small Russian town revealed that there had been a preceding mortality in rats and mice and that cats had also died in large numbers, exhibiting symptoms of vomiting, anorexia and emaciation. The human disease took the ulcero-glandular form and occurred during August and September when the river was in flood, the primary ulcers occurring on the legs. The disease was most prevalent in people working in flood water, and it is concluded that it was contracted by contact with water contaminated by infected rats and mice. There was no evidence of the infection spreading from cat to man, or from man to man.—U. F. R.

GREGORY, D. W. (1944). **Nutrient requirements of Hemophilus gallinarum.**—*Amer. J. vet. Res.* **5.** 72–78. **1763**

In view of inconsistencies in the results published by other workers, it was decided to attempt by using more highly purified materials to determine the exact nature of the requirement of *Haemophilus gallinarum* for accessory growth factors. Five strains of *H. gallinarum* were used. They grew throughout repeated transfers in bacto-peptone water containing yeast extract. Two strains of *H. influenzae* were also grown in the same medium, thus indicating that the yeast extract contained X-factor, the quantity of which in filtered yeast extract was found to be dependent on the type of bacterial filter used. *H. gallinarum* failed to give continued growth in peptone water containing large quantities of purified X- and V-factor, thus indicating that another factor or factors or a coenzyme were required. G. concluded that if required at all, X-factor was only necessary in very minute amounts. The optimum concentration of NaCl for good growth was found to be about 1%.

G. failed to show that the presence of agar in the medium had any stimulating effect on the growth of *H. gallinarum*.—J. D. BLAXLAND.

JORDAN, R. C., & JACOBS, S. E. (1944). **The growth of bacteria with a constant food supply. I. Preliminary observations on Bacterium coli.**—*J. Bact.* **48.** 579–598. [Authors' summary copied *verbatim*.] **1764**

Bacterium coli has been cultivated in an apparatus which permits rigid control of temperature, pH, aeration, and culture volume, and also allows food to be supplied at any desired rate by means of an automatic syringe mechanism.

From a number of experiments, determinations of total and viable cell populations were made and growth curves constructed. At each of the two rates of constant food supply used, an initial period in which the total and viable counts were both increasing was followed by a steady phase in which the viable counts remained constant or decreased slightly while the total cell counts steadily increased. When, in experiments which had reached the steady phase, the food supply was suddenly doubled, a second phase of cell multiplication similar to that in the initial period began and was succeeded by a second steady phase. When during the first steady phase the food supply was suddenly stopped, the total cell population remained constant but the viable cells decreased to a constant low level.

The significance of the growth curves is discussed and approximate calculations made of the amount of food used in the formation of a new *Bacterium coli* cell and in maintenance of a cell apart from reproduction. These amounts of Difco dehydrated broth are found to be $1{\cdot}1 \times 10^{-9}$ mg and $0{\cdot}4$ to $0{\cdot}5 \times 10^{-9}$ mg per 25 hours respectively.

GWATKIN, R., & MOYNIHAN, I. W. (1944). **The effect of diet, chilling and gastro-intestinal irritation on susceptibility to infection with S. suipestifer.**—*Canad. J. comp. Med.* **8.** 66–79. **1765**

Experiments were made to determine the effect of poor and good diets on the susceptibility of pigs to infection with *Salmonella cholerae-suis*.

In the first experiment there were eight groups of four pigs. They were fed on a basal diet of grain (oats, wheat, barley) and salt, which was supplemented in seven of the groups with :– limestone; $CaCO_3$ and tankage (cooked and dried animal offal of high protein food value); $CaCO_3$, tankage and feeding oil; $CaCO_3$, tankage, feeding oil and dried yeast; $CaCO_3$, tankage, feeding oil and nicotinic acid; $CaCO_3$, tankage, feeding oil and iron sulphate; $CaCO_3$, tankage, feeding oil and NaOH solution. After about 11 weeks on these diets, the pigs were exposed to *S. cholerae-suis* infection by mixing 200 ml. of a 24-hour broth culture with their evening feed. Several animals developed high temperatures, and all were ill. Two died, one in group two and one in group five, and the organism was recovered from both. The others improved in health. Bacteriological examination did not yield *S. cholerae-suis* from any of them. Six more exposures to the infection were given, but the last exposures appeared to have little effect on the pigs. Twenty were slaughtered and on P.M. examination no evidence of *S. cholerae-suis* was found. Haemoglobin tests were made and the lowest Hb readings occurred in the low protein diet groups, one and two, and in group eight receiving NaOH daily.

In the second experiment maize was substituted for the basal ration in three groups. Exposure on two occasions to infection with a 24-hour broth culture of the same strain failed to produce necrotic enteritis. Pigs from each group were exposed to infection and left for 52 hours in outside pens where the temperature was –9°F. to –14°F. Neither the diets nor the chilling had influence on susceptibility.

In the third experiment gastro-intestinal irritation was produced by croton oil and powdered red squill after exposing the animals on two occasions to infection. Two different strains of *S. cholerae-suis* were used, but there was no evidence of infection on P.M. examination.

In the fourth experiment, five groups of three pigs were put on a basal ration with oil, tankage, soya bean oil-meal and mixtures of these substances. On the 184th day they were exposed to 15 ml. each of 24-hour broth culture by mouth. This was repeated at intervals of 48–72 hours for ten exposures. All the pigs survived. There was no evidence of necrotic enteritis on P.M. examination. In all four experiments the cultures produced transitory results of a toxic nature but *S. cholerae-suis* did not become established in any of the exposed animals.

No conclusions are drawn from this work, but a

suggestion that *S. cholerae-suis* may be considered as a symbiont or as a secondary invader is offered.—J. L. B.

STENIUS. (1943). Finland. Smittsam kastning hos häst. **[Infectious abortion in mares in Finland.]**—*Skand. VetTidskr.* **33.** 510–511. **1766**

This is a summary of a government control order for paratyphoid abortion in mares, which is made notifiable and, when verified by laboratory means, is to be controlled by orthodox hygienic measures. All mares over three years old on infected farms must be immunized by antiserum and vaccine. District veterinarians have executive authority to arrange the necessary hygienic control.—J. E.

—. (1944). Foreløpig melding fra Veterinaerdirektøren om resultatet av bekjempingen av smittsom kasting pr. 31. desember 1943. **[Report from the Veterinary Directorate on the control of bovine brucellosis in Norway as at December 31st, 1943.]**—*Norsk VetTidsskr.* **56.** 136–141. **1767**

During the year, 3,152 herds were under control and 3,137 were declared free at the end of the year, only seven having infected animals at the last test and eight at the previous test. [Herds are declared free after two negative tests.]

A graph shows the numbers of infected herds since 1936, when 463 were known. By the end of 1937 this number had been reduced to 146 and by 1943 to 9, including original and new infections. [It is not stated how many of the total cattle in Norway are included in this control scheme.]—J. E.

*KNUDSEN, M. (1942). Bekaempelse af smitsom Kalvekastning ved Hjaelp af Blodprøve-Diagnostikken inden for de enkelte Besaetninger og mejerikredsvis. **[Control of brucella infection by means of blood testing.]**—*Medlemsbl. danske Dyrlaegeforen.* p. 611. [Abst. from abst. in *Skand. VetTidskr.* **33.** 485 & 502–505.] **1768**

K. describes the successful elimination of brucellosis, on a small island, from 980 herds each containing less than 10 animals over one year old. No difficulty was experienced in removing infection within two years by a slaughter policy.—J. E.

PALMEIRO, J. M. (1943). "Bradsot" nos arietinos portugueses. **[Bradsot in Portugal.]**—*Repos. Lab. Pat. vet., Lisboa.* **5.** 205–210. [English, French and German summaries.] **1769**

During the last three years, an enzootic disease of sheep, in the nature of a haemorrhagic septicaemia, has broken out in Torres Vedras. An organism presumed to be responsible for the condition was isolated from the blood of moribund animals and from the gastric mucosa of dead animals. It proved to belong to the "malignant oedema" group of bacteria. The organism is not named but is said to resemble one of the bacilli stated by F. ROSATI (1932) to be responsible for bradsot in Sardinia. [The features of the disease resemble braxy to some extent, but the organism isolated is not identical with *Clostridium septicum*, nor with *Cl. chauvoei*, *Cl. oedematiens* or *Cl. welchii*.]—I. W. BROCKLEHURST.

BRITTON, J. W. (1944). **Distension as a factor in gastro-intestinal diseases of herbivores.**—*Cornell Vet.* **34.** 227–234. **1770**

The author casts doubt upon the theory that enterotoxaemia in lambs is due to absorption of *Clostridium welchii* Type D toxin. He suggests that a mechanism similar to that operating in inhibitory ileus in man is responsible.

In human medicine great importance is attached to distension in cases of acute intestinal obstruction. In that condition distension stimulates the secretory activity of the bowel and enormous amounts of fluid are poured into the intestine. The fluid is not reabsorbed from the lower gut because of the obstruction. The result is a loss of blood chlorides, with dehydration of the blood and a rise in non-protein nitrogen and sugar. The increasing distension closes the veins but the arteries continue to pour blood into the bowel wall and haemorrhage occurs from venules and capillaries. In inhibitory ileus in man the symptoms and P.M. findings are identical with those of intestinal obstruction.

B. points out the similarity between the symptoms and P.M. findings in intestinal obstruction in animals and those of the enterotoxaemias of ruminants, grass sickness in horses and digestive diseases in newborn lambs and foals. Hyperglycaemia and a fall in blood chlorides are said to be present in each of these diseases. The opinion is expressed that the primary cause of the enterotoxaemias of ruminants and grass sickness of horses is atony of the bowel; this produces distension which is the important factor. The cause of the bowel atony is probably long-continued ingestion of a ration low in fibre. A history of feeding on a low fibre ration is said to be a feature of outbreaks of grass sickness in horses, pulpy kidney disease in lambs and enterotoxaemias in cattle. The value of starvation and the addition of roughage in stopping outbreaks is stated to lie in their action in stimulating the gastro-intestinal tract and mechanically filling the stomach, so preventing overeating of the richer feeds.

B. considers that in the aetiology of these diseases *Cl. welchii* and its toxins play only a secondary and terminal part. He urges the need for further study of the enterotoxaemias with special reference to factors other than bacteriology.—M. C.

STEWART, S. E. (1945). **The titration of *Clostridium perfringens* (welchii) antitoxin by its antihemolytic activity.**—*Publ. Hlth Rep., Wash.* **60.** 345–350. **1771**

S. describes an haemolysin test in which mouse red blood cells are used for titrating sera of low α antitoxin content. 0·5 ml. of a 2% suspension of washed mouse red blood cells are added to each 0·5 ml. of the toxin-antitoxin mixture and incubated at 37°C. in a water bath for one hour. Over 300 human sera and 100 g. pig sera were tested comparatively by the method described, as against the usual *in vivo* method. S. also demonstrated that ionized calcium was essential for lysis by α toxin.—S. JAMIESON.

JENSEN, R. (1943). **Eperythrozoonosis in cattle and sheep of Louisiana, preliminary report.**—*Bull. La agric. Exp. Sta.* No. 366. pp. 8. **1772**

Organisms considered to be probably identified with *Eperythrozoon wenyoni* and *E. ovis* have been encountered in cattle and sheep in Louisiana. The former occurred in splenectomized calves and was commonly associated with *Anaplasma*; it appeared to cause anaemia, but no serious disease. *E. ovis* caused anaemia and a febrile reaction in sheep. The thermal death point of eperythrozoa of sheep is greater than 48°C. and less than or equal to 50°C. so that the organism cannot be separated from anaplasms by heating, as anaplasms have approximately the same range of resistance. The eperythrozoa of cattle and sheep are host specific, though the bovine strain will survive in sheep into which it has been inoculated.—U. F. R.

BENNETT, S. C. J. (1944). **Cryptococcus infection in Equidae.**—*J. R. Army vet. Cps.* **16.** 108–118. **1773**

Cases of cryptococcus infection have been encountered in the Sudan in which the lesions are confined to the lungs, or the lungs and associated lymph nodes without any antecedent history of septic wounds. These cases mainly show respiratory distress with or without nasal discharge and the infection can some-

times be detected by examination of the nasal discharge. Cases of nasal infection may also occur in which there is no ulcer within sight. One case is recorded in which no ulcer could be found, and others in which the lachrymal bone was involved, with a fistula leading to the maxillary sinus. Conjunctival cases may show ulceration, but in many the picture is only that of purulent conjunctivitis. Small superficial wounds which heal spontaneously may harbour cryptococci; other infections have been found with a haematoma, fistulous withers and in one, a tick sore communicating with a retro-peritoneal abscess surrounding the rectum. Specimens sent in as suspected neoplasms have also been found infected.

It is suggested that in countries where infection is enzootic there is no kind of suppurative condition in equines which may not contain cryptococci, that the classical conception of thickened lymphatic vessels and persistent suppuration must be preceded by early septic foci, and that cryptococci can be found in conjunctival and nasal discharge before ulceration of the membranes.

It is argued that slaughter is not justifiable in countries where infection is enzootic though it may protect units such as mounted police, whose horse stock is virtually isolated from the general equine population. There is general agreement that total mortality is not more than 10 to 15 per cent., and it seems that all cases should be treated in which there is a good chance of early recovery, as in any case many infected animals escape detection. It is also suggested that the incubation period is not as long as described, and that undetected infections, such as cryptococcic conjunctivitis, serve to maintain infection between one open case and the next.

Medicinal treatments hitherto described are for all practical purposes useless; animals under treatment continue to discharge the organisms, but surgical treatment is claimed to give fairly good results, and should be undertaken when the relationship of the lesion to the regional lymphatics gives a hope of early success.

The validity of *Cryptococcus mirandei* of the donkey is discussed, and it is argued that it is not a good species and cannot be involved in explanation of infections not showing the orthodox lesions.—U. F. R.

ALLEN, T. (1945). **Some observations on the relationship of** *Alternaria tenuis* **to canine eczema.**—*J. Amer. vet. med. Ass.* **106.** 163–164. **1774**

A. states that during the past two years it has been claimed that the common grass mould, *Alternaria tenuis*, is the main agent concerned in producing canine eczema ("summer itch") in dogs. These claims were apparently based on the finding of mould spores in 95% of skin scrapings from cases of acute and chronic eczema. A. found pollen grains of ragweed in all cases of eczema but spores of *Alternaria* in only 25% and the same proportions were found in skin scrapings from normal dogs. The finding of pollen grains and mould spores in skin scrapings during the late summer months is not surprising, for at the height of pollination 5–10 million pollen grains settle on 1 sq. metre in 24 hours. There is no evidence in support of the view that eczema in dogs is caused by fungi.—E. G. WHITE.

HULIN, P. (1943). Vaccination contre la pleuro-pneumonie infectieuse de la chèvre. **[Vaccination against caprine contagious pleuro-pneumonia.]**—*Bull. Serv. zootech. Epiz. A.O.F.* **6.** No. 1, 2, 3 & 4. 48–51. **1775**

A vaccine was prepared from goats affected with pleuro-pneumonia by mixing 400 g. of minced consolidated lung and 100 ml. of pleural fluid with 500 ml. of water containing 4% formalin. The suspension was left at room temperature for 24 hours. The vaccine (10 ml.) was given subcutaneously behind the shoulder to 400 goats. Seven months later all the animals were alive although in the intervening period an outbreak of caprine pleuro-pneumonia had caused a substantial mortality in unprotected goats.—R. E. GLOVER.

LELANNE, A. (1943). Quelques observations au sujet de la vaccination antipéripneumonique avec le vaccin-culture. **[Immunization against bovine contagious pleuro-pneumonia with culture vaccine.]**—*Bull. Serv. zootech. Epiz. A.O.F.* **6.** No. 1, 2, 3 & 4. 43–47. **1776**

In view of the contradictory reports on the value of unmodified bovine contagious pleuro-pneumonia culture as an immunizing agent, L., working on the Ivory Coast, inoculated cattle subcutaneously with the 43rd generation of a strain obtained from Dakar. Adult cattle and zebus showed a mild swelling which disappeared in about three weeks, but the young hornless native breeds of cattle reacted severely, with large and persistent local lesions, loss in condition and an occasional death. Three months after inoculation, cases of the natural disease occurred in some of the protected animals.

L. does not recommend the vaccine for field use. —R. E. GLOVER.

See also absts. **1796, 1797** (staphylococci), **1872-1875** (mastitis), **1876** (glanders), **1877** (salmonella), **1878** (porcine enteritis), **1879** (clostridia), **1880, 1903** (TB.), **1815** (tumour-haemorrhage factor in bacteria), **1865-1867** (bactericidal agents), **1910** (brucellosis).

DISEASES CAUSED BY PROTOZOAN PARASITES

BORNAND, M. (1944). Contribution à l'étude du Trypanosoma equiperdum (Doflein). **[Studies on** *T. equiperdum***.]**—*Schweiz. Arch. Tierheilk.* **86.** 201–205. [In French.] **1777**

Working with a strain of *T. equiperdum* which had been maintained in mice, B. found that in a dead animal kept at 20°C. the organisms were not infective after three days, but in an animal kept at 2°C. they were still infective after six days. Although he was able to produce infection with culture material after six days, he was not able to obtain any growth in sub-cultures. He was able to infect mice by way of the conjunctival mucous membrane, but not by oral administration or injection *per rectum*. He was not able to infect rabbits, g. pigs or fowls, but points out that the infectivity of a mouse strain may differ from that of an equine strain. [Even equine strains vary considerably in their infectivity to experimental animals.]—U. F. RICHARDSON.

*FORCK, F. (1942). Über das Vorkommen von Trichomonaden bei Rindern in Deutschland. **[Bovine trichomoniasis in Germany.]**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierarztl. Wschr.* **51.** 13.] **1778**

This genital disease of cattle is very prevalent in the Saarpfalz, in Hesse, Thuringia, Saxony and Silesia and in a lesser degree, in Southern Germany, in the Rhine Province, in the Sudetenland and in East Prussia; it is rarely found in Austria, Westphalia, Hanover-Brunswick, Brandenburg, Schleswig-Holstein, Mecklenburg and Pomerania. The disease preponderates in districts occupied by small farmsteads; this may be partly due to the system of keeping a communal bull for

breeding purposes. All the different breeds of cattle exhibit the same susceptibility. A map is included showing the distribution of the disease in certain areas. —C. HORTON SMITH.

SVEC, M. H. (1944). **Bovine intracutaneous and serological reactions to fractions of Trichomonas foetus (protozoon).**—*J. Bact.* **47.** 505–508. **1779**

Four incompletely characterized fractions were prepared from bacteria-free cultures by a modified Fuller (1938) formamide extraction. These were tested for ring and precipitate formation against sera from four artificially immunized and two normal cows. A polysaccharide fraction and a possible nucleoprotein fraction failed to give a precipitate with any sera, whilst slight precipitation was given with the two other fractions, one to a serum from an animal immunized intramuscularly with live organisms and the other fraction to an animal immunized intramuscularly with formol-killed organisms.

An ammonium sulphate protein fraction gave a specific precipitate in both the above immunized animals.

Four of the fractions were injected intracutaneously into the tail fold of seven immunized and two control cows and readings were made at 6, 24, 48, and 96 hours; there were no reactions.

S. concludes that the results do not give any hope of developing a serological or skin test for the diagnosis of trichomoniasis in cattle.—A. E. PIERCE.

WENRICH, D. H. (1944). **Morphology of the intestinal trichomonad flagellates in man and of similar forms in monkeys, cats, dogs, and rats.**—*J. Morph.* **74.** 189–211. **1780**

Attention is drawn to the morphological similarity existing between *Trichomonas hominis* of the intestinal tract of man, and flagellates observed in the intestine of certain monkeys, cats, dogs, and rats. In a survey of the literature on transmission experiments, it is shown that intestinal trichomonads from any one of these different hosts may be transmitted to any other. W. therefore concludes that the same species may be found in each of these hosts.—A. E. PIERCE.

BOUGHTON, D. C. (1945). **Bovine coccidiosis: from carrier to clinical case.**—*N. Amer. Vet.* **26.** 147–153. **1781**

Bovine coccidiosis is considered from the points of view of transmission, diagnosis, species of coccidia involved, practical control measures and treatment. Sources of infective oocysts are usually mud, bedding, feed and water, and the coats of animals which have been fouled with faecal matter. The contact of a susceptible animal with a carrier is likely to produce only a light infection which although not causing much damage to the host, will increase the number of coccidia originally ingested. A calf with such an infection is a "multiplier" and contact with it is more likely to produce a sub-clinical infection than is contact with a carrier. Infections in which the only symptoms are non-bloody diarrhoea and poor growth are responsible for a considerable amount of calf mortality. Young calves exposed to very large numbers of oocysts discharged by such cases are likely to develop severe clinical infections which may prove fatal.

Diagnosis is based upon case history, gross pathology seen P.M. and microscopical examination of the intestinal mucosa or faecal material. There is no specific level of oocystoutput which divides "significant" from "insignificant" infections but B. finds that in both experimental and natural infections in dairy calves 1–3 months old, oocyst counts in the neighbourhood of 5,000–10,000 per g. of faeces were nearly always associated either with outright clinical coccidiosis or with severe infections characterized by diarrhoea, enteritis and general unthriftiness. He points out that oocyst discharge may be limited to a short interval of 3–6 days in even the most severe infections. Diagnosis in dairy calves is complicated in the earliest phase of infection and the possible concomitant operation of some other cause of diarrhoea in young calves. Diagnosis of coccidiosis in one of a group of calves is usually all that is necessary because the presence of heavy infection indicates that coccidiosis is a very likely cause of any diarrhoea that may be present in the group and is a possible source of clinical infection of the group as a whole.

Descriptions of the several species of coccidia occurring in calves are included in the paper as well as a routine procedure for examining a group of calves for clinical coccidiosis. Recommendations for practical control include the segregation of calves according to specified age groups and the prevention of excessive exposure to infection. With regard to treatment it is believed that although control is preferable the use of a drug may be justified where an early diagnosis is made.—C. HORTON SMITH.

*WILLEMS, A. E. R., & DOORME, H. (1941). **[Cases of bovine coccidiosis in Holland.]**—*Vlaam. diergeneesk. Tijdschr.* p. 185. [Abst. from abst. in *Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **51/49.** 177.] **1782**

Four cases of bovine coccidiosis were reported in East Flanders during the summer months. Calves of approximately four months of age were seen to be suffering from violent diarrhoea without any evidence of blood. Oocysts were found in large numbers in the faeces of one calf and to a lesser degree in another. *Haemonchus contortus*, *Nematodirus filicollis* and *Capillaria bovis* were also present.

In two other calves which were emaciated, small numbers of oocysts were found in the faeces. The coccidia were identified as *Eimeria zürni*. The owner had repeatedly lost calves which had been affected with diarrhoea admixed with blood. The animals had grazed in wet weather in the same locality as one calf which had subsequently died and it is assumed the infection spread in this way. Treatment with 5% creolin and a rectal douche of 2% sodium salicylate and 1% trypaflavine gave beneficial results in the one case but not in the other.—C. HORTON SMITH.

HAMMOND, D. M., DAVIS, L. R., & BOWMAN, G. W. (1944). **Experimental infections with Eimeria bovis in calves.**—*Amer. J. vet. Res.* **5.** 303–311. **1783**

As most natural infections of bovines involve several species, little information is available on the pathogenicity and course of infection of the various species of coccidia in cattle. The paper presents data on the symptoms, course of infection, and relationship between the numbers of oocysts administered and the severity of the disease in calves which have been experimentally infected with *E. bovis*. Infections were produced when 1,000 oocysts were administered.

Symptoms were slight when up to 25,000 oocysts were administered, but were marked and caused death in five out of seven animals when 125,000 or more were given. All the calves which died exhibited pronounced pathological changes in the caecum and colon associated with large numbers of oocysts. A relatively heavy discharge of oocysts began on the 18th–20th day following infection and lasted for 5–6 days. Small numbers were passed for 2–3 weeks after the cessation of the heavy discharge.—C. HORTON SMITH.

SMITH, B. F., & HERRICK, C. A. (1944). **The respira-**

tion of the protozoan parasite, *Eimeria tenella*.—*J. Parasit.* **30.** 295–302. **1784**

The rate of respiration increases in parasitized caecal epithelium. There is a greatly reduced metabolic rate in the fully sporulated resting oocyst and the respiration of unsporulated oocysts is 10–20 times greater than that of sporulated oocysts; this respiration remains almost constant through a wide range of pH, *i.e.* 1·2–8·8.—C. HORTON SMITH.

RIGDON, R. H. (1944). **A pathological study of the acute lesions produced by *Plasmodium lophurae* in young White Pekin ducks.**—*Amer. J. trop. Med.* **24.** 371–377. **1785**

Ducklings two weeks old were inoculated into the leg vein with blood infected with *P. lophurae*, mixed with an equal volume of 2% sodium citrate in physiological saline; they were then killed 2–15 days after inoculation. A complete autopsy was made immediately after killing and tissues were fixed for histological study.

No pathological lesions were found in birds killed on the second day after inoculation. The spleens of birds killed on the fourth day after inoculation were slightly larger than normal and this increase in size and in pigmentation of spleens was present in each case up to the fifteenth day. The liver exhibited definite progressive pigmentation in birds killed from the fourth to the fifteenth day. Parenchymatous degeneration in the epithelial cells of the renal tubules was observed. The lungs and femoral bone marrow became progressively pigmented as the infection developed. Acute fibrinous pericarditis, frequently with haemorrhage in the epicardium, was seen in several instances after the fourth day following inoculation. The brain showed no lesions. Phagocytic cells in the bone marrow were filled with malarial pigment. Groups of mononuclear cells were seen in the lumen of some of the large blood vessels after the fifth day of the disease. The basic pathological lesions included a marked decrease in the number of red blood cells observed in the spleen of the ducks which died or were moribund when killed. There is a rapid development of anaemia arising from the destruction of the red blood cells by the parasite which plays an important part in the production of these lesions.—C. HORTON SMITH.

CANTRELL, W., & JORDAN, H. B. (1945). **New mosquito hosts for *Plasmodium gallinaceum*.**—*J. Parasit.* **31.** 55–56. **1786**

Nine American species of mosquitoes were tested for their susceptibility to infection with *P. gallinaceum*. Eight species proved to be susceptible, *viz*, *Aëdes campestris*, *A. stimulans*, *A. triseriatus*, *A. trivittatus*, *A. vexans*, *Culex salivarius*, *Mansonia perturbans* and *Theobaldia inornata*. *Culex pipiens* was not susceptible; 120 specimens were fed on infected fowls but none became infected.

These results are in accord with those of other workers and confirm that no species of *Aëdes* has yet been found which is not susceptible to *P. gallinaceum*.

In these experiments *A. vexans* seemed to be particularly susceptible.—M. C.

BELONJE, C. W. A. (1944). **Biliary fever of dogs in East Griqualand.**—*J. S. Afr. vet. med. Ass.* **15.** 1–3. **1787**

This paper deals with the incidence of *Babesia canis* infection in the area concerned. It was found that the symptoms varied a great deal and it was possible to make a definite diagnosis only by blood smear examination. Treatment with acaprin did not give satisfactory results and subsequent treatment with pirevan or trypanblue was sometimes necessary; these both gave satisfactory results, especially the latter. A fresh solution of trypanblue should be used for every case.—E. M. ROBINSON.

BARBONI, E. (1942). Emorragie encefaliche multiple e theileriosi dei bovini da *Theileria annulata*. **[Multiple brain haemorrhage in cattle with *T. annulata* infection.]**—*Nuova Vet.* **21.** 11–15. **1788**

M. describes two cases of cerebral haemorrhage associated with *T. annulata* infection of cattle in the Tiber valley, but points out that this complication has only been encountered in 2% of cases.

The animals gave signs of excitement followed by depression and on autopsy, congestion of the meninges and punctiform haemorrhages into the brain substance were found. These haemorrhages were most numerous in the white matter, and are said to represent small haemorrhagic infarcts resulting from the degeneration of the endothelial cells of the precapillaries. No other abnormality occurred in the brain substance, except that in areas where the haemorrhages were numerous there appeared to be some thinning of the neuroglia. The whole picture is one of disturbance of circulation rather than inflammation.

B. mentions that *T. annulata* and *T. parva* occur in the Tiber valley, about 80% of the infections being due to the former. [What is meant by *T. parva* is not clear, but it does not seem that B. intends to suggest that East Coast fever occurs in Italy.]—U. F. R.

THOMAS, A. D. (1944). **Sarcosporidiosis in sheep, and its relation to certain forms of myositis.**—*J. S. Afr. vet. med. Ass.* **15.** 4–5. **1789**

In a study of changes in the muscles from various parts of the body in cases of blue tongue in sheep, T. took the opportunity of observing the effect of the changes on sarcosporidia. These were only numerous in four out of 60 sheep which were examined. In blue tongue a degenerative myositis occurs which may proceed to necrosis of the muscle fibres. This necrosis may cause the death of the sarcosporidia involved and results in a local inflammatory reaction possibly due to the liberation of sarcocystin.—E. M. ROBINSON.

See also absts. **1772** (anaplasms), **1798** (malaria), **1883** (avian malaria), **1808**, **1881**, **1882** (trypanosomiasis), **1812** (entamoeba), **1884** (coccidiosis in lambs), **1885–1887** (in fowls), **1888** (rabbit syphilis), **1912** (*T. vivax* in experimental animals).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

REMLINGER, P., & BAILLY, J. (1942). Les formes cliniques de la rage de la souris blanche. **[Clinical forms of rabies in the white mouse.]**—*Arch. Inst. Pasteur Algér.* **20.** 1–9. **1790**

On account of the scarcity and cost of rabbits and g. pigs, the authors were forced to use white mice as test animals. They give a detailed description of the symptoms of rabies in these animals, the majority of cases falling into two main groups, furious and paralytic. In certain exceptional cases remission of symptoms is shown; such remissions may be mistaken for cures, but in a short time symptoms recur and death follows.

A special peculiarity of rabies in the white mouse is the frequent occurrence of a conjunctivitis with either a serous, mucous or chylous discharge.—M. C.

MITCHELL, C. A., & GWATKIN, R. (1944). **Studies on swine fever. I. Efficiency of crystal violet vaccine on Canadian swine.**—*Canad. J. comp. Med.* **8.** 314–324. **1791**

Pigs given crystal-violet vaccine were exposed to infection by placing in each group one pig injected

subcutaneously with virus. The results of four experiments grouped together showed that 45 out of 68 (66·17%) vaccinated pigs died following exposure to infection, together with the 26 unvaccinated controls and the seven injected pigs which had been used as disseminators of virus. The results in these pigs are so different from those reported in pigs from countries where swine fever is enzootic, that the possibility of natural resistance playing some part in the results obtained in these countries would seem to be worthy of consideration.

TRAUM, J., & SCHOENING, H. W. (1945). **Vesicular exanthema in swine.**—*J. Amer. vet. med. Ass.* **106.** 30–33. **1792**

Vesicular exanthema occurs in garbage-fed swine in the state of California. The disease is caused by a virus and the lesions are indistinguishable clinically from foot and mouth disease. T. records that three immunologically different types of the disease have been demonstrated.

Cattle are not susceptible and the pig is the only animal that can be infected experimentally with regular results. Varied effects are obtained from hamsters; other laboratory animals are not susceptible.

The relationship between vesicular exanthema and vesicular stomatitis is discussed. The only control adopted is the prohibition of movement of infected stock for thirty days after the confirmation of an outbreak.—J. A. J. VENN.

COLES, J. D. W. A. (1944). **Psittacosis in a budgerigar** (*Melopsittacus undulatus*).—*J. S. Afr. vet. med. Ass.* **15.** 10–12. **1793**

A case of psittacosis is recorded in a budgerigar in the Transvaal. The bird had a greatly enlarged spleen and slight enteritis. As smears from the lungs showed aggregations of granules resembling the psittacosis virus, mice were inoculated with pooled organ material. All the mice died of psittacosis. An attempt was made to infect pigeons by the conjunctival route with this virus, but without success.

The budgerigars in the aviary from which the case had come were all destroyed. After unsuccessful attempts at poisoning with arsenic it was found that the best method of destruction was by the use of carbon monoxide gas, obtained from the exhaust of a motor car.—E. M. ROBINSON.

JUNGEBLUT, C. W., & SANDERS, M. (1942). **Studies in rodent poliomyelitis. V. Interference between murine and monkey poliomyelitis virus.**—*J. exp. Med.* **76.** 127–142. [Authors' summary and conclusions copied *verbatim*.] **1794**

JUNGEBLUT, C. W. (1945). **Studies in rodent poliomyelitis. VI. Further observations on interference between murine and simian strains of poliomyelitis virus.**—*Ibid.* **81.** 275–294. [Author's conclusions copied *verbatim*.] **1795**

V. The murine strain of SK poliomyelitis virus interferes with the propagation in *rhesus* monkeys of SK, Aycock, and RMV poliomyelitis monkey virus. This interference is demonstrable by intracerebral injection of mixtures of murine and monkey virus prepared *in vitro* as well as by separate injection of the two viruses by diverse routes. Mixture tests carried out with graded doses of murine and monkey virus show that 0·5 c.c. of a 10 per cent suspension prepared from the brains of paralyzed mice is capable of counteracting at least 100 minimal paralyzing doses of two strains of monkey virus.

No interference was demonstrable with suspensions of brains infected with murine virus which had been inactivated by heating for 1/2 hour at 75°C., or with suspensions prepared from normal mice, or with brain suspensions prepared from mice infected with herpes virus. When murine virus is introduced into monkeys by the intravenous route, before or after intracerebral infection with monkey virus, distinct prophylactic or therapeutic results may be obtained. Analysis of the figures shows that the success of interference depends upon (a) the size of the infecting dose of monkey virus, (b) the amount of murine virus injected, and (c) the choice of proper intervals between the injection of monkey and murine virus. The mechanism of the interference phenomenon here described is discussed in the light of the available data.

VI. Attempts to separate by processes of physical segregation, *i.e.*, ultra-filtration, ultracentrifugation, or dialysis, from live SK murine poliomyelitis virus a non-pathogenic agent capable of interfering with simian poliomyelitis virus were unsuccessful. Neither was it possible to convert live SK murine virus into a non-pathogenic interfering agent by processes of chemical inactivation, *i.e.*, phenolization or formalinization. Preparations of SK murine virus, which had been markedly attenuated by ultraviolet irradiation, gave evidence of having retained some interfering power in *rhesus* monkeys.

MM murine poliomyelitis virus interfered, both in mixture tests and by peripheral administration, with two simian strains of poliomyelitis virus. With adequate amounts, distinct protective effects could be obtained in *rhesus* monkeys which had received murine virus (animal passage or tissue culture virus) up to 48 hours after intracerebral infection with simian poliomyelitis virus. Theiler's virus of spontaneous mouse encephalomyelitis, when tested in mixture with simian poliomyelitis virus, gave some evidence of irregular and low grade interference. Interference could not be shown conclusively in experiments to prevent poliomyelitic infection or to modify its effects.

The nature of the interfering agent present in murine virus is discussed.

See also absts. **1758** (F. & M. disease), **1789** (blue tongue), **1799** (poliomyelitis), **1800** (virus vaccines), **1801** (aggln. of virus-coated bacteria), **1803** (rabies), **1889** (ornithosis), **1890** (rickettsia).

IMMUNITY

MARSH, H. C. (1944). **The synergic activity of staphylococcus toxin.**—*Yale J. Biol. Med.* **17.** 359–382. [Author's conclusions copied *verbatim*.] **1796**

The synergic activity of staphylococcus toxin is not manifested only by toxins of the Burky strain of staphylococcus, Ha. Toxins produced by strain Wood 46 are also excellent synergic agents. The capacity for synergic activity is not possessed by all strains of staphylococcus, however, as filtrates of non-toxin-producing strains are synergically inactive. It seems possible that any good toxin-producing strain is capable of synergic activity.

The method of preparation of the toxin is immaterial in so far as the demonstration of synergic activity is concerned. The shake-culture technic is at least as effective as is stationary culture in the production of a synergically active toxin. The medium used for the production of the toxin is seemingly unimportant. Any medium that supports the formation of a staphylococcus toxin appears to be satisfactory. Broth is unnecessary to the production of a synergically active toxin. Staphy-

lococcus toxoid is at least as effective as staphylococcus toxin in demonstrating synergic activity, suggesting that toxicity is not the decisive factor in producing this phenomenon. Toxins retain synergic activity only in so far as they retain antigenic activity. The factor responsible for the synergic activity of staphylococcus toxin, toxoid, and toxin-antitoxin seems to be the impact of the antigenic groups of these preparations on the antibody-producing cells, stimulating the cells to a heightened reactivity. There is no evidence at hand that the toxin, or any of its derivatives, conjugates with the weak antigen to confer upon it enhanced antibody-stimulating properties.

SMITH, W., & HALE, J. H. (1944). **The nature and mode of action of staphylococcus coagulase.**—*Brit. J. exp. Path.* **25.** 101–110. **1797**

The nature and mechanism of the action of staphylococcal coagulase has been investigated. Coagulase has been demonstrated as a thermostable substance, particulate, or associated with particles of uniform size. By itself it is inert in the conversion of fibrinogen to fibrin. It is, however, the precursor of a thrombin-like substance which can convert fibrinogens into fibrin clot. The thrombin-like substance is thermolabile and its concentration at any moment depends upon various factors, particularly temperature, time, and the concentrations of reagents. The formation of the thrombin-like substance is dependant upon the participation of an activator which although present in some plasmas can be deficient or totally lacking in others. The nature of the activator is not yet known. Testicular extracts were used on the assumption that the agent might be thrombokinase, but this was disproved by removal of practically all the kinase by dialysis from the plasma, without removing the coagulase activator. It is concluded that the non-coagulability of some animal plasmas and of occasional human plasmas in routine coagulase tests, is due to a deficiency of activator, or to conditions which prevent the accumulation of sufficient thrombin-like substance.—S. JAMIESON.

TALIAFERRO, W. H. (1944). **Immunity in malaria.**—*Amer. J. clin. Path.* **14.** 593–597. **1798**

In mild types of malaria there is a rise in parasitaemia to a peak, then a decline to low-grade infection and eventually to latency which is interrupted by frequent relapses, whilst in severe types, parasitaemia increases until death; if treated, however, immunity develops and eventually controls infection.

From the start of infection large numbers of merozoites are destroyed by phagocytosis; in natural immunity phagocytosis is sluggish, whereas in acquired immunity it is intense. This phenomenon is probably due to specific agglutination followed by opsonization. Acquired immunity can be passively transferred with immune serum.

Acquired immunity is highly effective but is probably only strain specific, and dwellers in one area may be immune there, but not immune when moved 100 miles away. Immunity is largely associated with a latent infection and probably does not last long after infection is completely eliminated.

The mechanism of relapse is thought to depend on the persistence of the parasites as tissue stages, but unless there is a decrease of immunity, any erythrocytes invaded by parasites emerging from the tissue cells would be immediately removed. Complement-fixing antibodies appear during malaria, but as effective complement-fixing antigens for human malarias have been prepared from *Plasmodium knowlesi* and *P. gallinaceum*, the antigen involved must be a genus antigen and so markedly different from the strain-specific antigen of acquired immunity.—U. F. RICHARDSON.

HOWE, H. A., & BODIAN, D. (1945). **Passive immunity to poliomyelitis in the chimpanzee.**—*J. exp. Med.* **81.** 247–254. [Authors' summary copied *verbatim.*] **1799**

A series of 6 chimpanzees was inoculated orally with stool from a poliomyelitis patient. Three of these animals had been given 170 cc. of homologous, hyperimmune monkey serum prior to inoculation, while three were unprotected. All 6 of the animals were subsequently shown to have poliomyelitis virus in their stools and characteristic lesions in their central nervous systems although none of them developed paralytic poliomyelitis. All of the immunized animals had demonstrable blood antibody at the time of inoculation although it was present in only one case 30 days later.

SCHMIDT, S. (1944). Virus-Vacciner. **[Virus vaccines.]**—*Maanedsskr. Dyrlaeger.* **56.** 261–274. **1800**

This text of a lecture on the development of virus vaccines also includes reference to anatoxins, in order to relate the use of formalin with or without the principle of adsorption to the preparation of these immunizing agents. It is an excellent review which calls for reading in full.—J. E.

ROBERTS, E. C. (1945). **Serologic agglutination of virus-coated bacterial cells. Technic of the "B.A." method.**—*J. Immunol.* **50.** 55–59. **1801**

Previous papers have claimed that neurotropic viruses may be adsorbed to heat-killed bacterial cells and subsequently agglutinated by specific hyperimmune serum, or by the serum of convalescents. WEIL [*V. B.* **13.** 244] has shown that with some modification the method can be applied to the virus of swine fever. As certain details of procedure are important in applying this method, the technique is now given in detail as regards the viruses of St. Louis encephalitis and Lansing poliomyelitis. For virus material 10% brain suspension in unbuffered saline is triturated with sand, centrifuged at 2,000 r.p.m. for 15 min., the supernatant fluid collected and adjusted to pH 6·5, and used fresh or kept at −76°C.

The growth of *Chromobacterium prodigiosum* from a culture on infusion agar, incubated upright at 37°C. for 24 hours, is collected in unbuffered saline, centrifuged, resuspended in distilled water and exposed to flowing steam for 30 min. The suspension is diluted until it contains 0·5 mg. of bacterial nitrogen per ml., and the pH is adjusted to 6·5. The brain suspension is mixed with the bacterial suspension in the ratio of 1 mg. of bacterial nitrogen to the suspension from one mouse brain.

The mixture is incubated for 9–15 hours, centrifuged for 10–15 min. and the cells resuspended in 4 ml. saline warmed to 37°C. Unadsorbed virus must be removed by repeated washing with warm saline until the virus suspension is such that it will no longer be infective to a mouse. The cells are then resuspended in 15–20 ml. warm saline and centrifuged at 800 r.p.m. for 5 min. to throw down the larger clumps. Small amounts of the serum to be tested are inactivated and put up in appropriate dilutions, control tubes being provided for serum turbidity, antigen turbidity and known positive and negative sera. To each tube is added an equal quantity of the virus-coated bacterial suspension; the tubes are then placed in a water bath at 42°C. for two hours.

A list is given of the possible sources of error, the most important being the use of buffered saline, antigen suspension exceeding 0·2 mg. N per ml., inadequate washing of the bacterial-virus suspensions which inhibits agglutination, and the use of cold saline which elutes virus from the cells, and results in an inferior antigen.—U. F. RICHARDSON.

REDDIN, L., Jr. (1945). **Reaginic allergy in cattle.**—*Amer. J. vet. Res.* **6.** 60–64. **1802**

Numerous papers have been published on anaphylaxis in the lower animals, but the literature dealing with allergic disease is scanty save in respect of serum disease and infectious allergy such as may be demonstrated by the tuberculin and mallein reactions. WEIL & REDDIN [*V. B.* **14.** 195] showed experimentally that supersensitivity to ragweed pollen was the same in cattle as in man. They showed that a sensitizing antibody or reagin could be produced in the skin of cattle by parenteral administration of ragweed pollen. This article reports further studies on the characteristics of the ragweed reagin of cattle.

The 42 cattle available to the authors were first tested for sensitivity to ragweed pollen and it was found that 40% were sensitive. The site used for test injections was the thin skin over the shoulder ; unpigmented areas were chosen for convenience in reading results. R. used stock glycerine extract of giant ragweed, containing 2·8 mg. of nitrogen per ml., such as is used in testing human beings.

Passive transfer of sensitivity from a hypersensitive cow to two negative cows by intradermic injection of high dilutions of serum was successful. Passive transfer of human reagin to the skin of cattle was successful but the reverse experiment was inconclusive. Three cows which were sensitive to skin tests were tested for ophthalmic reactions by blowing ragweed pollen on to the eyeball. One of these reacted by congestion of the eyeball and increased lachrymation. Reversibility of the reagin-antigen combination, as in the human being, was demonstated.

The authors point out that although 40% of their cattle proved to be sensitive to ragweed, clinical symptoms of ragweed sensitivity have not so far been recorded. They consider their results indicate the need for further studies of unexplained conditions in animals, such as heaves in horses and eczema and urticaria in all animals.

The scanty literature is briefly reviewed and references given.—M. C.

*JEŽIĆ, J., & KODRNJA, E. (1938). Contribution à l'étude de l'hypersensibilité spécifique de la rage. [**Specific hypersensitivity to rabies.**]—*Anal. Inst. Victor Babes, Bucarest.* **9.** 110–114. [Abst. from abst. in *Bull. Inst. Pasteur.* **42.** 19.] **1803**

The authors, arguing on analogy with work done by Metalnikov on mites of bees, recommend that prophylactic antirabies vaccination of dogs should be deferred until all other means of limiting the spread of the disease have failed, lest a minority of those vaccinated develop a state of specific hypersensitivity.—W. M. H.

*SCHMIDT, W. Das Berufsekzem des Arztes und seine Ursachen. [**Occupational dermatitis in doctors and its aetiology.**]—*Med. Welt.* No. 38/39. p.676. [Abst. from abst. in *Berl. Munch. tierärztl. Wschr./Wien. tierärztl. Mschr.* Oct. 29th. 385–386. (1943).] **1804**

The doctor's skin tends to be continually in contact with a large number of irritant substances, especially disinfectants. Formalin, and also lysoform, because of its formalin content, frequently cause a chronic and persistent form of dermatitis ; disinfectants containing phenol can also cause the condition. The skin is especially sensitive to denatured alcohols and to chemicals dissolved in alcohol, such as diethylesters, phthalic acid, picric acid, pyridine bases and methyl alcohol. Morphine, novocain, percaine, alypin and related substances are also conducive to dermatitis.

—S. M. G.

See also absts. **1757** (tuberculin sensitivity), **1775**, **1776** (vaccines against pleuro-pneumonia in goats and cattle), **1779** (reactions to *T. foetus*), **1791** (swine fever vaccine), **1810** (? anaphylaxis from midge bites), **1821** (allergy in pulmonary emphysema of horses).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

DAVIDSON, J. (1944). **On the relationship between temperature and rate of development of insects at constant temperatures.**—*J. Anim. Ecol.* **13.** 26–38. **1805**

D. describes the use of a formula of the logistic type to express the relationship between temperature and the time required for development in insects. The method used in calculating the curve is described in detail for the eggs and pupal stages of *Drosophila melanogaster*. Data for the embryonic development of the flies *Musca domestica*, *Cochliomyia macellaria*, *Phormia regina* and *Lucilia sericata* are also fitted to this type of curve. The value of this empirical formula can be gauged from the fact that in all these cases it provides a very close fit for 85–90% of the range of temperatures at which development can take place.

—J. B. CRAGG.

BLAGOVESHCHENSKIĬ, D. I. (1940). Fauna SSSR. Opredelitel' pukhoedov (Mallophaga) domashnikh zhivotnykh. [**Fauna of the U.S.S.R. Mallophaga parasitic on domestic animals.**] pp. viii + 89. Moscow : Zoologicheskiĭ Institut Akademii Nauk SSSR. New Series No. 27. 8vo. . **1806**

A general introductory section deals with the external morphology, internal anatomy, biology, host distribution, and systematic affinities of the biting lice. Their economic importance and the question of control are reviewed, together with the treatment of infested mammals and birds. The technique of collection and preservation of biting lice is described.

In the systematic section, 49 species comprising 19 genera are fully detailed, and 39 species are clearly figured. [B. does not follow the subdivision (EWING, 1936) of the genus *Trichodectes*.] No new species are recorded. Descriptions are based on material in the author's own collection, and in that of the Zoological Institute of the Soviet Academy of Science. Information on geographical distribution and lists of hosts are included in the accounts of the species. Keys are given for the identification of genera and species, and an extensive bibliography is included.—J. A. CAMPBELL.

BAKER, D. W., & DALMAT, H. T. (1943). **Key to the larvae of botflies and warble flies infesting domestic animals in New York State.**—*Rep. N.Y. St. vet. Coll., 1941–42.* pp. 110–113. **1807**

This short key provides a useful means of identifying the larvae of the botflies and warble flies found in New York State. It provides a useful guide for those veterinarians in this country who wish to make a quick identification of these larvae ; it would not, however, enable them to differentiate completely between the three species of *Gastrophilus* commonly found in this country, as the key has no reference to *G. haemorrhoidalis*. A series of diagrams, which illustrate the main features upon which differentiation is made, accompanies the key.—T. E. GIBSON.

CHORLEY, J. K. (1944). **Tsetse fly operations. Short survey of the operations by districts for the year ending December, 1943.**—*Rhod. agric. J.* **41.** 412–419. **1808**

Local considerations are mainly emphasized in this extract from the annual report of the Chief Entomologist for Southern Rhodesia. Tsetse eradication and control has been effected mainly by game eradication and clearing. Whilst the position in the old cleared areas appears to be satisfactory, some of them now supporting healthy cattle populations, the rapid advance of *Glossina morsitans* from Portuguese East Africa into the Sabi valley, and the discovery that *G. pallidipes* has a wider distribution than was known, have created new serious problems. Grass burning is defended as a method of maintaining clearings and it is claimed that it is essential in game destruction as it prevents the formation of dense thickets to which game can retire. The problem of soil erosion is said not to arise in tsetse-infested areas owing to the absence of cattle. [This does not appear to be sound reasoning.]

Three centres of human sleeping sickness are known to exist, and eight cases of the disease occurred during the year. Examination of traffic on two roads indicated a considerable increase of following tsetse fly on one of them.—U. F. RICHARDSON.

EIGENDORF. (1943). Auftreten der Kriebelmückenplage im Lahntale. **[Occurrence of plagues of midges in the Lahn valley, Germany.]**—*Berl. Münch. tierärztl. Wschr.[Wien. tierärztl. Mschr.* Dec. 10th. 428–429. **1809**

E. describes the occurrence of plagues of midges (*Melusina maculata*) in a number of districts in Germany. These midges swarmed on cattle and caused extreme irritation around the eyes, nostrils, mouth, anus, udder and genital organs. Deaths were recorded but were confined to one-year-old animals.—J. B. CRAGG.

MILLAR, J. L., & REMPEL, J. G. (1944). **Live stock losses in Saskatchewan due to blackflies.**—*Canad. J. comp. Med.* **8.** 334–337. **1810**

A heavy flight of blackflies (*Simulium arcticum*) was noticed in the morning, and animals began to die that night and continued to do so until the following afternoon. A survey of the area revealed that at least 132 animals had died and that 95 others showed various degrees of swelling. Cattle, horses, sheep, and pigs were attacked. The less hairy portions of the body were the areas usually attacked. Losses in sheep were confined to animals which had been sheared.

The most common symptom was an oedematous swelling involving the throat and ventral portion of the body. This was accompanied by heavy jerky breathing with a distinct muscular tremor. Later there was collapse and gasping for breath; death then occurred in a few minutes. The interval between the occurrence of visible symptoms and death was in most cases 15 min. to two hours. Animals living for a longer period showed gradual improvement, with almost complete recovery in 24–48 hours.

All dead animals had a great many reddish-purple spots, about 2 mm. in diameter, on the skin along the lower and more tender parts of the body. A small quantity of serous matter exuded from each of these, and when dry appeared as small blackish beads attached to the hair. The body cavities contained large quantities of clear or blood-stained serous fluid. All organs and mucous membranes showed evidence of serous infiltration.

[Thousands of animals died in Rumania and Yugoslavia in 1923, 1934 and 1937 after being bitten by swarms of *Simulium* (the "Golubatz midge", *Danubosimulium columbaczense*—see *V. B.* **10.** 765–766). The symptoms and lesions were very similar to those now described from Canada. Rapid and complete cure is said to have occurred in four severe cases after the injection of anthrax antiserum (see *V. B.* **10.** 590). The cause in the Danubian outbreaks was thought to be a toxin injected by the flies but the rapid onset of symptoms, the nature of the symptoms, the P.M. findings and the rapid and complete recovery of those animals which did not die are very suggestive of an anaphylactic or allergic condition.—ED.]

—THOS. MOORE.

GRIFFIN, C. A., & DEAN, D. J. (1944). **Demodectic mange in goats.**—*Cornell Vet.* **34.** 308–311. **1811**

The authors describe the occurrence of mange due to *Demodex caprae* in two herds of Saanen goats. The lesions consisted of single or multiple epidermoid cysts containing mites in various stages of their life history. These cysts occurred indiscriminately over the body. To eliminate the disease, affected animals not required for breeding were destroyed; the others were clipped and gross lesions surgically removed. For a period of at least three weeks after clipping, the animals were dressed once weekly. Mercuric nitrate ointment diluted with 3 parts neatsfoot oil was used for the head and genital organs and the remaining parts of the body were brushed with a rotenone preparation (rotenone 5, acetone 125, cottonseed oil qs. 500). Only two small lesions, both occurring on the same goat, were found in the six-month period following clipping. The authors emphasize that the symptoms of the disease are not very obvious and many cases may escape detection.

—J. B. CRAGG.

See also absts. **1786** (vectors of *P. gallinaceum*), **1891** (fly control).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

CRAM, E. B. (1943). **The effect of various treatment processes on the survival of helminth ova and protozoan cysts in sewage.**—*Sewage Wks J.* **15.** 1119–1138. **1812**

The survival in sewage of protozoan cysts and helminth ova of species pathogenic to man was estimated by experimental treatment simulating the routine treatment of sewage. Cysts of *Entamoeba histolytica* were present in the effluent of settling tanks, and hookworm eggs and *Ascaris* eggs were found to a less extent. *Entamoeba* cysts and helminth ova in the effluent were found to pass through trickling filters and to survive the activated sludge treatment, but chemical precipitation by the production of an alum floc during secondary settling removed the amoeba cysts from the sewage. The cysts were also removed by intermittent filtration through a 24-in. layer of sand at the rate of 100,000 gal. per acre per day. Sludge digestion destroyed the amoeba cysts, but the helminth ova survived the process and also the subsequent drying of the sludge. All *Ascaris* eggs, however, were killed by heating dried sludge to 103°C. for 3 min.—T. E. GIBSON.

SHORB, D. A. (1944). **Factors influencing embryonation and survival of eggs of the stomach worm, Haemonchus contortus.**—*J. agric. Res.* **69.** 279–287. **1813**

The effects were tested of heat, dryness, and oxygen on the development and survival of the eggs of *H. contortus* in fresh faecal cultures. It was found that if the culture jars were sealed so as to prevent the entry of air, embryonation of the eggs ceased and they were not viable after about 3–4 weeks. Below 55°F. the eggs did not develop to the infective stage, and if exposure to such temperatures was of sufficient duration the eggs died. Temperatures higher than the optimum for

development were deleterious to the eggs, and the lethal effect increased with increase in temperature. The eggs were rapidly killed by drying, although a few survived several hours in apparently dry faeces. Tables in the text give the details of these findings.—T. E. Gibson.

Sarles, M. P. (1944). **Effects of experimental nodular worm (Oesophagostomum columbianum) infection in sheep.**—*Tech. Bull. U.S. Dep. Agric.* No. 875. pp. 19. **1814**

Sixteen lambs carrying slight infestations with *Strongyloides* and coccidia and in some cases *Nematodirus* and *Trichuris* spp., were used in these experiments. Larvae of *O. columbianum* were fed to 12 of these lambs. Four were given 10 larvae per day, four were given 100 larvae per day, and four were given 1,000 larvae per day, for 28 days. The general findings are as follows. As the number of larvae administered increased, the establishment and persistence of adult nodular worm infection in the intestines decreased. The symptoms and pathological changes were related to the number of nodules in the intestinal wall rather than to the number of mature parasites in the lumen of the intestine. Amongst the symptoms noted in infested sheep were loss of weight, decreased rate of weight gain, stunting, emaciation, unresponsiveness, diarrhoea, weakness, loss of appetite and anaemia. Apart from emaciation the pathological changes were chiefly intestinal, *viz*, nodules in the small and large intestines. The infestation reduced the dressing-out percentage and increased the degree of shrinkage of the carcass on storage. The wool from severely infested sheep was short and dry. The debilitating effect of the disease appeared to be due chiefly to interference with normal intestinal functions caused by the nodules.—T. E. Gibson.

See also abst. **1893** (equine strongylosis).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

Zahl, P. A., Starr, M. P., & Hutner, S. H. (1945). **Effect of bacterial toxins on tumors. VII. The tumor-hemorrhage factor in bacteria.**—*Amer. J. Hyg.* **41.** 41–56. [For previous parts, see *V. B.* **15.** 46.] **1815**

Factors producing haemorrhage in grafted sarcomas, when injected intraperitoneally into mice, were present in 25 species of Gram-negative plant pathogens. The haemorrhage-producing factor is usually bound to the complex O-antigen. It is usually absent in Gram-positive organisms and was not present in several flagellate protozoa which were examined. The haemorrhagic factor was absent in 32 strains of streptococci which were examined. Comparison of extracts of rough and smooth strains of *Salmonella cholerae-suis* indicates that the lethal and the tumour haemorrhage-inducing factor go together. On the other hand, extracts of three strains of *Pasteurella pestis* contain a lethal factor but not the haemorrhage-inducing factor. —E. Boyland.

Dalton, A. J., & Earle, W. R. (1944). **Production of malignancy in vitro. VIII. Observations on the mitochondria and Golgi material.**—*J. nat. Cancer. Inst.* **4.** 539–554. [For previous parts, see *V. B.* **14.** 381–382.] **1816**

The writers give a description of the technique adopted for demonstrating mitochondria and Golgi material of cells in tissue culture. Since several workers have previously failed to demonstrate Golgi material in cells grown *in vitro* and have concluded that it is an artefact due to fixation, the methods described are of some importance; the authors give details of fixation and tissue culture technique.

It was found that the mitochondria of normal tissue culture cells, cells exposed to methylcholanthrene, and cultures of tumour cells, were all filamentous. The only difference in mitochondrial pattern noted was a loss of orientation in cells exposed for 406 days to the carcinogen. This change appeared to be due to an increased density of the cytoplasm and to the formation of numerous chromophilic droplets in the cytoplasm.

No differences in the pattern of Golgi material were detected when cells from control cultures and cells from cultures exposed to methylcholanthrene were compared. It was found that there was a correlation between the orientation of Golgi material of cells in the zone of growth, and the change in growth pattern of tissue culture cells exposed to methylcholanthrene. This phenomenon was thought to be due to permanent alterations induced in the cells by the carcinogen. The presence of the "internum" of Hirsch in the Golgi material of fibroblasts could not be demonstrated.

The writers emphasize that Golgi material was found in the cells of all cultures examined.

—John G. Campbell.

Loeb, L., Suntzeff, V., Burns, E. L., & Schenken, I. R. (1944). **Incidence of mammary carcinoma in mice treated with estrogen. Effect of the age at which the treatment with estrogens begins.**—*Arch. Path.* **38.** 52–59. **1817**

Male mice of strains C3H & D were given subcutaneous injections of an oestrogen (oestradiol benzoate), the dose being adjusted to the weight of the mouse.

The mice were divided into four age groups, group (a) being 2 weeks old at the time of injection, (b) being 4–6 weeks, (c) 1¾–2¾ months, and (d) 6–7 months. Mammary carcinoma developed only in groups (a) and (b), the latter being of the optimum age. The number of tumours which developed in groups (a) and (b) of C3H strain was greater than the number in the similar groups of D strain.

In female mice of strain C3H there was no significant difference in the different age groups in the incidence of mammary carcinoma induced by oestrogens.—John G. Campbell.

Kirschbaum, A. (1944). **Recent studies on experimental mammalian leukemia.**—*Yale J. Biol. Med.* **17.** 163–187. **1818**

K. reviews recent major developments in the study of mouse leucaemia.

As this condition occurs in a large proportion of mice of several inbred stains, and can be induced in others by various means, experimental material is readily available for the study of aetiology, diagnosis and treatment.

Mouse leucaemia is a similar disease to that seen in man, and all investigators are agreed as to its neoplastic nature, since lymphosarcoma and leucaemia appear to be different manifestations of the same condition. Spontaneous leucaemia does not arise multicentrically, whereas carcinogen-induced leucaemia may have multicentric foci of origin appearing simultaneously. It is not possible to transmit mammalian leucaemia by means of cell-free tissue extracts, blood plasma or suspensions of ruptured cells, but it can be transmitted by inoculation of viable leucaemic cells into a susceptible host, especially if it is of close genetic

relationship. Immunity to transplanted leucaemia has resulted from the inoculation of sublethal doses of cells, the administration of heat-killed leucaemic cells, etc., and a passive immunity has been obtained by the inoculation of the liver and spleen of immune animals. It has not been found possible to immunize against the spontaneous disease.

Many agents, such as carcinogens, X-rays, oestrogens, etc., can induce leucaemia in mice and the susceptibility of mice to certain of these agents has been shown to depend on their genetic constitution. It has occasionally been shown that there is a delay in the onset of leucaemia in hybrid mice, as compared with high-leucaemia stock. The breast-milk of certain strains of mice has been reported to contain a substance which influences the total incidence of leucaemia in genetically susceptible animals. This substance does not appear to be identical with the mammary cancer "milk-influence". It has been demonstrated that the feeding of a low cystine diet causes a reduced incidence of carcinogen-induced leucaemia. A diet low in lysine did not influence the incidence. Certain strains show a higher incidence of leucaemia in females than in males. Adrenal dysfunction may play a part in the development of lesions, since it has been reported that absence of adrenal secretion favours development of the disease.

K. observes that so far no suggestion for improving methods of early diagnosis or for the treatment of human leucaemia can be made.

There is an extensive bibliography.

—JOHN G. CAMPBELL.

LEE, A. M., SCRIVNER, L. H., & NORTH, M. O. (1944). **Avian leukosis and lymphomatosis.**—*Bull. Wyo. agric. Exp. Sta.* No. 266. pp. 32. **1819**

The authors investigated the avian leucosis complex in an attempt to find out if the causative agent obtained from one type of the complex was capable of inducing the other forms, and to discover the most susceptible age of chickens to infection, the incubation period, the mode of infection under natural conditions, and the influence of vitamin E on the incidence of the disease. 753 birds were used over a period of four years, and the results may be summarized as follows :–

(1) Laying pullets exposed to birds with the disease in any form developed it irrespective of the vitamin E content of the diet. In this investigation, normal or low vitamin E diets were supplemented with wheat germ oil.

(2) After intraperitoneal inoculation of suspension material from blood, liver, spleen, eyes and nerves of infected birds into five-month-old pullets one or other of the forms of the complex appeared, such as visceral lymphomatosis, neurolymphomatosis, erythroleucosis or ocular lymphomatosis.

(3) The actual mode of natural infection was not detected. In-contact birds frequently developed the disease in some form, whether they were allowed to mix with naturally occurring cases or those produced by injection of infective material. The administration *per os* of infective material did not increase the incidence of the disease in these in-contact birds.

(4) Very young chicks were more susceptible to experimental infection than were older ones, and susceptibility to infection gradually decreased until the adult stage, when birds were only very slightly susceptible. Such inoculated chicks were capable of transmitting the disease to uninoculated chicks in the same pen.

(5) The incubation period in the case of young inoculated chicks was usually found to extend into months and symptoms generally appeared after laying commenced.—JOHN G. CAMPBELL.

See also abst. **1894** (canine neoplasms and stilboestrol).

DISEASES, GENERAL

GRATZL, E. (1943). Zur physikalischen Lungendiagnostik bei der Bronchitis and Bronchopneumonie des Pferdes. **[Physical diagnosis of bronchitis and broncho-pneumonia in horses.]**—*Berl. Münch. tierärztl. Wschr./Wien tierärztl. Mschr.* May 28th. 155–160. **1820**

G. gives a general discussion on the subject of physical diagnosis of thoracic conditions and bacteriological examination of material from affected horses.

He strongly advocates the artificial induction of deep respiration before any physical examination of the chest is undertaken; this is obtained by holding the nostrils closed, trotting the horse a short distance, or by the intravenous injection of 7–15 ml. lobeline solution which in 15–30 seconds produces deep respiration lasting 1–3 min.—O. D. JAMES.

SEREN, E. (1942). Della leucocitosi granulocitica eosinofilo nell'enfisema polmonare cronico del cavallo quale espressione di malattia allergica. **[Granulo-eosinophilic leucocytosis, an allergic condition in equine chronic pulmonary emphysema.]**—*Nuova Vet.* **21.** 4–9. **1821**

It has been claimed that equine chronic pulmonary emphysema is due to an hereditary susceptibility to an allergic sensitization to the moulds of hay and is thus closely related to human asthma. S. undertook differential leucocyte counts of 50 horses to ascertain whether the eosinophilia which occurs in human asthma also occurs in the equine condition, but concludes that in equine chronic pulmonary emphysema there is no marked granulocytic eosinophilia.—U. F. RICHARDSON.

JANSCH, H., & LANGMANTEL, H. (1943). Schwefelwerte des Harnes gesunder und hufkrebskranker Pferde. (Ein Beitrag zur Frage des Schwefelstoffwechsels der Pferde.) **[Sulphur content of the urine of healthy horses and of horses with canker of the foot.]**—*Wien. tierärztl. Mschr.* **30.** 81–88. **1822**

The urine of healthy horses was compared with that from cases of canker in respect of its content of inorganic and ethereal sulphates, neutral sulphur, cystine and total nitrogen. The results were so variable that no conclusions of diagnostic value could be drawn from individual samples of urine. The average values for total sulphur, neutral sulphur and cystine were higher in the urine of horses affected with the disease than in samples from healthy horses, but in view of the fact that there were only 12 cases and no blood sulphur determinations were made, the authors hesitate to conclude that this average increase in the sulphur content of the urine in canker cases indicates a disturbance in sulphur metabolism.—ALEX. ROBERTSON.

WICKWARE, A. B. (1944). **Periarteritis nodosa in cattle.**—*Canad. J. comp. Med.* **8.** 303–307. **1823**

The author states that "for the present periarteritis may perhaps be regarded as a pattern of arterial reaction to antigenic substances rather than as a disease due to a single cause". Only three cases have been recorded in food-producing animals in Canada during the last 35 years. During a seventy year period only 200 human cases were recorded in the literature. Of these, the *intra vitam* diagnosis had been reported in 31 instances in several of which there existed a reasonable doubt

prior to necropsy. Nothing is known concerning the clinical aspect of this disease as it occurs in the lower animals. In human beings the most characteristic features are the presence of rheumatoid pains in the muscles and joints, an occasional sore throat, some temperature, indefinite colicky pains of the abdomen, leucocytosis and albuminuria.

Pictures of a macroscopic and a microscopic section of the heart and a chart entitled " Schematic chart of pathology of periarteritis nodosa " are included.

—Thos. Moore.

Boyd, W. L. (1944). **A clinical study of " white heifer disease ".**—*Cornell Vet.* **34.** 337–345. **1824**

Although " white heifer disease " has long been known to exist in the U.S.A., little has been published about the condition in that country. During the last 25 years, workers at the Minnesota Agricultural Experimental Station have studied 25 cases of the condition, all occurring in animals with white coats, although red and other coloured heifers included in infertility studies far outnumbered white heifers. Two cases occurred in Holsteins and the others in Shorthorns and all except one were brought to notice because of failure to conceive. Attempted breeding was often followed by tenesmus and sometimes by vaginal bleeding. Vaginal examination is unsatisfactory and rectal palpation is of the utmost importance in making a diagnosis. The uterine cornua are usually tubular but sometimes show oval or almost spherical thin-walled sacculations and are distended with a watery, odourless and turbid fluid. The Müllerian ducts can be felt as two hard fibrous tubes contained within a common sheath and running along the pelvic floor between the vagina and the uterine horns. The cervix is imperfectly formed or completely absent. The vagina is usually short and narrow and sealed by a hymen which is imperforate or shows a small opening 1–2 mm. in diameter. The uterine mucosa consists mainly of stratified epithelium, with occasional scattered columnar cells : caruncles are not present. The ovaries and oviducts are normal. The fluid contained within the uterus invariably proves to be sterile.

B. concludes that the condition is probably genetic in origin and that it is a form of sterility characterized by inhibition of development of the derivatives of the Müllerian ducts.—E. G. White.

Kernkamp, H. C. H. (1945). **Gastric ulcer in swine.**—*Amer. J. Path.* **21.** 111–113. **1825**

In a series of 754 pigs, varying in age from stillborn foetuses to animals nearly five years old, gastric ulcers were found in 18 animals, all under one year and mainly between 5 and 11 months old. In 10 animals a single ulcer was present; in the remaining eight the number varied from 2 to 15. Ulcers occurred in both fundic and pyloric regions and were usually confined to the mucosa, but in two cases extended into the muscle coats. The occurrence of ulcers in several animals under four months old may be related to nutritional anaemia, but no adequate explanation of the cause of gastric ulcers in swine is given.—E. G. White.

Mead, S. W., Cole, H. H., & Regan, W. M. (1944). **Further studies on bloat.**—*J. Dairy Sci.* **27.** 779–791. **1826**

This paper deals with bloat induced in cattle by feeding alfalfa in various forms. In a series of experiments, involving a small number of cows, which lasted over a period of 61 days, 194 cases of bloat were induced.

Ground alfalfa hay fed with an equal quantity of concentrates to four cows for 15 days produced bloat nine times, whereas only one case was produced when the hay was fed unground. Green alfalfa tops produced bloat 12 times, including seven severe attacks, when fed in a barn to six cows for nine days. Bloat occurred sooner if the animals were fed upon grain before being turned out to graze upon alfalfa. Lactating cows proved to be more susceptible to bloat than dry cows, owing to their greater intake of food.

Lack of coarse fibrous material in alfalfa is the chief cause of bloat; barley straw fed before alfalfa in one experiment did not prevent the condition, possibly because barley straw is unpalatable and an insufficient quantity was consumed.—R. F. G. Sandercock.

Kernkamp, H. C. H. (1945). **Gastroenteric disease in swine.**—*J. Amer. vet. med. Ass.* **106.** 1–6. **1827**

A clinical description is given of the common diseases of the stomach and intestines of the pig, including dyspepsia, ascariasis, macrocanthorhynchiasis, balantidiasis, coccidiosis and necrotic enteritis. In treatment, oil of chenopodium, phenothiazine, and hexylresorcinol are recommended for ascariasis, a milk diet for coccidiosis, and sulphaguanidine (about 1 g. per 10 lb. body weight per day), sulphasuxidine (about 1·5 g. per 10 lb. body weight per day) or sulphathalidine (about 1 g. per 10 lb. body weight per day) for necrotic enteritis. No fully satisfactory treatment has yet been developed for macrocanthorhynchiasis or balantidiasis.

—D. D. Ogilvie.

Streich, W. (1943). Allergisch-hyperergische, nekrotisierende Endometritis beim Schwein. [**Allergic-hyperergic necrotic endometritis in sows.**]—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **51/49.** 337–340. **1828**

S. examined P.M. a two-year-old sow which had died suddenly from cardiac failure shortly after a normal farrowing. An atypical endometritis was revealed in addition to a diffuse fibrinous peritonitis, degeneration of the cardiac muscle and pulmonary oedema. The uterine lesions were confined to a region 18 cm. long at the terminal end of the left horn. The macroscopic findings (an inflammatory process extending through all coats, with marked thickening of the mucosa, which contained large cystic cavities filled with yellow fluid) were borne out by the histological examination, which showed typical inflammatory degenerative and necrotic changes throughout the uterine wall, with marked vascular changes. A portion of degenerated amnion remained and the ovaries, Fallopian tubes and vagina were normal.

Bacteriological examination did not yield any significant results.

S. concluded that lesions were due to an allergic-hyperergic endometritis with direct spread to the peritoneum. He considered the cause to be resorption of proteolytic products of a dead foetus.—O. D. James.

Balás, G. (1941). Csersavokozta nagyfokú szörhullás lovakon. [**Severe depilation of horses caused by tannic acid.**]—*Állatorv. Lapok.* **64.** 38–39. **1829**

B. describes how rain water that has seeped through oak tree loppings can cause symptoms in horses similar to those of infestation by mange mites.

Army horses were tethered in the open during manoeuvres. To protect them against unusually heavy weather temporary shelters were built of various tree loppings; the rain seeped through in some places. Horses under willow, conifers, maize stems, etc. were not affected, but those under shelters constructed of oak loppings developed a severe dermatitis on the loins, quarters, chest and abdominal wall, the skin becoming inflamed, hot and painful. Under treatment the inflammation abated and about ten days later the hair fell out, the skin began to peel and scab formation commenced. The symptoms resembled those of mange,

but the horses gave no sign of itchiness; the distribution of the affected parts was atypical of mange infestation and skin scrapings were negative for mange mites. Four weeks later the condition cleared up and normal skin and hair growth returned.—G. SZILARD.

ASMUNDSON, V. S. (1944). **Inherited shortening of the long bones in the turkey.**—*J. Hered.* **35.** 295–299. **1830**

A single short-legged Bronze turkey hen, found in a commercial flock, produced in the F2 generation a good approximation to the ratio of three normal to one short, with about equal numbers of short males and females. The mutation was, therefore, a simple autosomal recessive. A full anatomical description is given of the mutant birds, which were characterized by a shortening of the long bones of the legs and wings. Hatchability and postnatal viability were so reduced by the mutation that only 3% of all short embryos were hatched and raised; hence the mutation was sublethal. Short embryos had shorter and thicker long bones than normal embryos. Heterozygous mature hens had slightly but significantly shorter tarsometatarsi than had normal hens of similar weight.—N. J. SCORGIE.

See also absts. **1770** (enterotoxaemia, grass sickness), **1774** (canine eczema), **1840** (pyometra in the bitch), **1895** (joint injuries), **1896** (joint injuries), **1910** (livestock diseases in the U.S.A.).

NUTRITIONAL AND METABOLIC DISORDERS

JOHNSON, S. R., & SMITH, R. M. (1944). **Relation of vitamin D to keel bone deformity in young chickens.**—*Poult. Sci.* **23.** 510–515. **1831**

Groups of chicks were fed from the time of hatching up to 3–5 weeks of age on a basal ration and on this basal ration supplemented with different levels of vitamin D. Their live weight, percentage of tibia ash and keel scores, based on the extent of the crookedness of the keel bones, were determined. It was found that the addition of vitamin D to the basal ration caused a significant increase in bone ash, the maximum effect being obtained with 25–50 I.U. per 100 g. of food. In all trials the degree of crookedness was reduced by the addition of vitamin D supplements, and in individual trials it was fairly closely related to the deposition of bone salts. Keel scores, however, varied considerably in different trials; severe crookedness was observed in some birds on the basal ration only, in others the degree of crookedness was slight, irrespective of whether the bird was on the basal ration or receiving vitamin D supplements. It appeared, therefore, that other factors, such as heredity, environment, growth rate, etc., were involved in the production of the deformity.—E. M. C.

DAM, H. (1944). **Toxicity of fractions of hog liver fatty acids to chicks fed a vitamin E deficient diet.**—*J. Nutrit.* **28.** 297–302. **1832**

Three fractions of pig liver fatty acids were tested for their influence in producing either an exudative diathesis or encephalomalacia in chicks reared on a vitamin E deficient diet. When fed as supplements at a 4% level in the diet, the least unsaturated fraction (iodine value 5) produced no encephalomalacia and exudates in only two out of ten chicks; the intermediate fraction (iodine value 104) produced both exudates and encephalomalacia, while the most unsaturated fraction (iodine value 241) caused a very rapid onset of encephalomalacia which killed nearly all the animals at an early stage before exudates had time to occur. The toxicity of this fraction was completely prevented by the administration of 10 mg. % of *d, l*-α-tocopherol acetate. When fed in smaller amounts (0·5–0·6% of the diet) this fraction caused both encephalomalacia and exudates, though they appeared more slowly than when given at a 4% level. A tentative explanation of the observations reported is given.—E. M. C.

WINTROBE, M. M., FOLLIS, R. H., Jr., HUMPHREYS, S., STEIN, H., & LAURISTEN, M. (1944). **Absence of nerve degeneration in chronic thiamine deficiency in pigs.**—*J. Nutrit.* **28.** 283–288. **1833**

Further experiments, conducted along lines essentially similar to those previously reported [see *V. B.* **13.** 297], confirmed the fact that degenerative changes in the nervous system do not occur in vitamin B_1 deficiency in the pig. It is suggested that, since autoclaving not only destroys the vitamin B_1 in yeast but also reduces its pantothenic acid content, certain effects hitherto ascribed to vitamin B_1 deficiency may in fact have been due to pantothenic acid deficiency.—A. N. W.

WOOLLEY, D. W. (1944). **The nutritional significance of inositol.**—*J. Nutrit.* **28.** 305–314. **1834**

W. deals briefly with experimental investigation of the role of inositol as a growth factor or dietary essential for micro-organisms, mice, rats, cotton rats, g. pigs, hamsters, and chicks, with the synthesis of inositol by animals, and with methods of analysis, structural specificity of action, chemical structure, and the natural occurrence of inositol and its derivatives. The question whether or not inositol is to be regarded as a dietary essential is left open.—A. N. WORDEN.

See also absts. **1763** (growth factors for micro-organisms), **1765** (diet and necrotic enteritis), **1779** (diet and enterotoxaemia, grass sickness), **1826** (diet and bloat), **1841** (vitamins in mare's plasma).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

POHLE, E. M., KELLER, H. R., & HAZEL, L. N. (1945). **Monthly changes in fineness, variability, and medullation in hairy lambs.**—*J. Anim. Sci.* **4.** 37–46. [Authors' conclusions copied *verbatim*.] **1835**

The fleeces of 69 lambs classed as hairy at docking time were examined by the cross-section method at monthly intervals until yearling age at the U.S. Sheep Experiment Station and Western Sheep Breeding Laboratory.

The number of hairs constituted only a small fraction of the total population, and these diminished rapidly as the lambs increased in age. Fewer hairs were found on the side than on the thigh or back. Fiber diameter decreased between 6 and 11 months of age, showing a slight increase thereafter. This may have been due to weaning and subsequent poor feeding or to inherent properties of the fiber follicles. Variability of fiber diameter decreased until about 11 months of age. Variability was greatest on the thigh and least on the side. Monthly trends in variability were similar for the side, thigh, and back. Percentage medullation decreased very rapidly from two to five months of age and more slowly thereafter. A rather pronounced increase in medullation was noted on the thigh during the last three months. Medullation was not a constant property, varying considerably from month to month for individual lambs.

The yearling fleeces of the hairy lambs were compared to those of a much larger group most of which were classed as non-hairy at docking. No important

differences were found in the yearling fleeces of hairy and non-hairy lambs as regards hairiness, mean diameter, variability or percentage medullation.

*Filipovič, S. (1942). Der Übergang des Wassers aus der Frühjahrsweide in die Milch. [**Effect on the milk of water in spring pasture.**]—*Milchw. Forsch.* **21.** 179. [Abst. from abst. in *Z. Fleisch- u. Milchhyg.* **53.** 48.] **1836**

The percentage of water in cow's milk was found to decrease slightly during the change from stall-feeding to grazing.—A. Robertson.

Nordskog, A. W., Comstock, R. E., & Winters, L. M. (1944). **The relationship between certain blood components and rate of growth in swine.**—*J. Anim. Sci.* **3.** 422–430. **1837**

In an endeavour to find criteria that would allow of a more accurate evaluation of hereditary capacity for growth, the haemoglobin and serum protein levels of growing pigs were studied. The authors conclude that although these blood constituents are related to past growth, they are not indicative of future growth rate.
—J. A. J. Venn.

Berg, O. A. (1944). Blodsukkerbestemmelse hos storje. [**Blood sugar estimation in cattle.**]—*Norsk VetTidsskr.* **56.** 107–136. **1838**

For blood sugar estimations B. used the Fujite-Iwatake modification of the Hagedorn-Jensen method and with it obtained reliable results as checked with water containing known amounts of glucose; with bovine blood the normal sugar levels were lower than have been reported by other estimation methods, B.'s figures being 41·5–66 (av. 56) mg. %. The existence of psychic hyperglycaemia, *i.e.*, abnormally high sugar levels supposedly due to the emotional disturbance of the animal at sample taking, could not be verified.

Glycolysis in kept blood samples could be inhibited by the addition of 1,000 mg. % of potassium fluoride in samples kept at temperatures between 4° and 20°C.

Tests on the constituent parts of the blood showed that cow serum and plasma contain more glucose per unit volume than whole blood. For such tests it is important to separate the serum without delay, otherwise glycolysis begins where serum and clot meet in the tube.

Cow blood corpuscles contain 24 mg. % glucose, plasma 58 mg. % and whole blood 48 mg. % on a unit volume basis.—J. E.

I. Meyer, L. M., & Bloom, F. (1943). **The bone marrow of normal dogs.**—*Amer. J. med. Sci.* **206.** 637–641. **1839**

II. Bloom, F. (1944). **The blood and bone marrow in pyometra.**—*N. Amer. Vet.* **25.** 483–484, 486 & 488. **1840**

I. The cytology of the bone marrow was studied in 10 normal dogs by puncture of the crest of the ilium. The skin and hair over the thickest part of the crest was sterilized, but not clipped, and no anaesthetic was used. The medullary cavity was entered by a 15–18 gauge needle, 1¾ in. long and fitted with a stylet, and 0·1–0·2 ml. of marrow was aspirated with a syringe. Smears must be prepared immediately as coagulation occurs very quickly.

One table gives full details of the peripheral blood and bone marrow picture of each dog and a second ummarize s the findings of earlier work by others.

II. Several workers have recorded a neutrophile leucocytosis with a marked "shift to the left" in pyometra in the bitch. B. studied the blood and bone-marrow picture in five bitches with pyometra and compared the results with those which he recorded previously for normal dogs. Bone marrow was obtained from the iliac crest by a method described in I. A table gives full details of the blood and bone-marrow findings, including total and megakaryocyte counts.

The main findings in the pyometra cases were as follows. (1) Peripheral blood: increased red cell count and haemoglobin, marked leucocytosis (average 99,480) with a decided "shift to the left", toxic changes in the neutrophile leucocytes with absence of granules, and basophilia of the cytoplasm in many of the non-segmented cells. (2) Bone marrow: increase in total white cells and megakaryocytes, relative increase in neutrophilic cells at the expense of erythropoietic forms, toxic changes, and disturbed maturation of neutrophilic cells.

The polycythaemia and rise in haemoglobin are probably indicative of anhydraemia caused by vomiting, polyuria, and fever. The changes in the bone marrow explain the blood picture characteristic of pyometra.
—E. G. White.

Rasmussen, R. A., Cole, C. L., & Miller, M. J. (1944). **Carotene, vitamin A, and ascorbic acid in mare's plasma.**—*J. Anim. Sci.* **3.** 346–350. **1841**

It was found that in mares the values for plasma carotene increased greatly during the pasture season, but that there was no corresponding increase in plasma vitamin A. It appears that the horse is an inefficient converter of carotene to vitamin A, as compared with the cow whose plasma vitamin A value has been shown to increase with the carotene level during the pasture season. In the mares there was no evident correlation between the vitamin A value of the plasma and its ascorbic acid content, which increased during the pasture period. The authors conclude that an increase in plasma ascorbic acid occurs with dietary intake of this principle.—N. J. Scorgie.

Maass, A. R., Michaud, L., Spector, H., Elvehjem, C. A., & Hart, E. B. (1944). **The relationship of copper to hematopoiesis in experimental hemorrhagic anemia.**—*Amer. J. Physiol.* **141.** 322–328. **1842**

Eight dogs recently weaned were fed on a raw cows' milk ration supplemented with crystalline B vitamins and manganese. Cows' milk contains only 0·10–0·20 mg. Cu per litre; there was therefore a gradual depletion of Cu reserves. The control dog received adequate supplementation of Fe and Cu. When the animals were about four months old, they were all rendered anaemic by bleeding. A haemoglobin level of 5·1–6·4 g. per 100 ml. was obtained. In the control dog, receiving adequate Cu there was a rapid regeneration of haemoglobin which reached 11·6 g. per 100 ml. at the end of 19 days. There was a similar increase in haemoglobin in a dog which had been receiving Fe but no Cu, when 3 mg. of Cu were fed daily immediately after haemorrhage. If the daily administration of Cu was delayed for varying numbers of days up to seven weeks the anaemia showed no response to dietary supplementation of Fe in the absence of Cu, but immediately 3 mg. of Cu were given daily, there was an increase in haemoglobin and red cell counts to normal values. If adequate Cu but no Fe was fed there was severe nutritional anaemia. 10, 20 or 30 mg. Fe with 3 mg. Cu gave the characteristic remission in anaemic dogs. The results suggest that Fe and Cu are dependent on each other for adequate blood formation.—E. M. J.

Schönswetter, H. (1943). Untersuchungen über die Verwendbarkeit des Kupferchloridkristallogramms beim Pferde. [**The use of the copper chloride crystallogram in the horse.**]—*Wien. tierärztl. Mschr.* **30.** 1–13. **1843**

The crystallization changes induced in a 20% copper chloride solution by the addition of whole blood

or blood serum were investigated to see if they had any clinical applications. The tests were carried out on 111 horses, some healthy, others affected with various diseases, but in neither blood nor serum were the appearances of value for diagnosis.—A. ROBERTSON.

*Soós, A. (1943). **[Polypeptide N content of the urine of domestic mammals.]**—*Inaug. Diss., Budapest.* [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.*/*Wien. tierarztl. Mschr.* Feb. 4th. **48.** (1944).] **1844**

The amount of polypeptide nitrogen present in the urine of different species is independent of sex and age. The amounts found in different species expressed in mg. per 100 ml. urine were: horse 0–7·14 (average 2·68), cow 0·41–4·8 (average 3·94), sheep 2·04–6·94 (average 3·94), man 0·82–1·43 (average 1·1).—E. B.

BRADBURY, J. T. (1944). **The rabbit ovulating factor of plant juice.**—*Amer. J. Physiol.* **142.** 487–493. **1845**

It has been found that a substance occurring in green plants, such as alfalfa, oats, corn, carrot-tops and lawn-grass cuttings, induces ovulation in rabbits when injected intravenously. Large quantities of the substance have been prepared as frozen plant juice, or as a dried precipitate.

Anoestrous rabbits, after a priming treatment with oestrogen, ovulated when given an injection with copper acetate. In another experiment, six anoestrous rabbits were given oestrogen subcutaneously and the next day were injected intravenously with oats' extract, 2 mg. per kg. body weight. These plant extracts may be so toxic that they can be tested only within a limited dose range. Five rabbits responded, two ovulating and three having follicles that luteinized without ovulation; the sixth died. Oestrogen pretreatment increases the sensitivity of the anoestrous rabbit to the plant juice factor. By comparison it seems that the plant juice factor acts in a similar way to copper acetate. A nervous mechanism is activated which causes a release of gonadotropic hormone from the pituitary, in quantity sufficient to cause ovulation. In an experiment using immature rats, plant juice extracts which were capable of causing ovulation in rabbits were not effective, either by increasing the dosage or by giving the extract together with pituitary extracts. Evidence indicates that the rabbit ovulating factor of plant juice may be effective by virtue of its toxicity and that it is not gonadotropic in nature.—E. M. J.

ROBERTSON, A. (1944). **Sex hormones in theory and practice.**—*Vet. Rec.* **56.** 101–103. Discussion p. 103. **1846**

R. gives a survey of the present state of knowledge of the endocrine control of reproductive processes.

This knowledge has found its most successful clinical application in pregnancy tests in human beings and equines. The results of hormone therapy are conflicting and at present disappointing; this is probably due to lack of sufficient theoretical knowledge which prevents a full understanding of a very complex subject. A table and three diagrams enhance the value of the paper.—F. L. M. DAWSON.

*BORRØE, R. (1942). Kønskirtlernes Hormoner og Seksualrytmens Regulation. **[Sex hormones and the control of the oestrous cycle.]**—*Medlemsbl. danske Dyrlaegeforen.* p. 389. [Abst. from abst. in *Skand. VetTidskr.* **33.** 484 & 485–492.] **1847**

This is a good summary of the knowledge of sex hormone physiology in man and the domestic animals, with emphasis on the former.—J. E.

*AKUCS, L. (1942). **[Sexual cycle in cattle.]**—*Inaug. Diss., Budapest.* pp. 16. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 523.] **1848**

In an observation carried out on 80 cows and 20 heifers it was found that oestrus occurred most frequently in May (12·4%) and in September (11·25%) and least frequently in February (3·43%) and April (4·85%). Following parturition, the first oestrus was seen after 19–210 days, the majority of cows (73·5%) coming into oestrus 2–4 months after parturition. The greater number of cattle conceived in May (15·57%) and October (12·6%), whilst in February only 3·75%, and in September and November 5·22% conceived. Parturition occurred chiefly in February (14–18%) and in June (11·19%); fewer parturitions were observed in October and November *viz*, 4·74%. The average duration of pregnancy was 286 days for cows and 287 days for heifers. Of the heifers, the greatest number (22·23%) were pregnant in September and 90% of them conceived at the first service, whilst 10% required two or more services before conception took place.—T. E. G.

HAMMOND, J., Jr., & BHATTACHARYA, P. (1944). **Control of ovulation in the cow.**—*J. agric. Sci.* **34.** 1–15. **1849**

In a study of the control of ovulation and the possibilities of obtaining twin pregnancies at will, 400 cows and heifers which were to be slaughtered at Cambridge in 1940–41 were examined *per rectum* and *per vaginam* some 10 days before slaughter. After eliminating those with advanced cystic disease, most of the pregnant animals and those in which the corpora lutea could not be palpated, 180 were left which were reasonably suitable for experiment. The material was not ideal as many of the cows had been discarded from herds as sterile on account of salpingitis and metritis. The gonadotropins used were pregnant mare serum and horse pituitary extract. These were used in individual doses corresponding to from 800–5,000 I.U. p.m.s.

The animals were divided into groups. The first group of 18 cows and the second of 18 heifers each received gonadotropin at the time of expulsion of the corpus luteum. The third group received gonadotropin but the corpus luteum was not expressed. 19 of this group were in mid-cycle, five pregnant and 19 at the end of the cycle. A fourth large group received gonadotropin at intervals varying from five days before, to three days after, expulsion of the corpus luteum. In this group the cows were served after treatment and slaughter was delayed for a period sufficient to allow of implantation to take place. The results of all treatments were observed after slaughter of the animals.

Pregnant mare serum and horse pituitary extract produced similar effects; 100 mg. of horse pituitary was equivalent to 1,500 I.U. of p.m.s. Observations of results in the first two groups showed that 1,500 I.U. p.m.s. should stimulate follicle growth sufficiently for a twin ovulation to occur. The onset of oestral symptoms after expressing the corpus luteum seemed to be accelerated by administration of gonadotropin. When given in mid-cycle, without expression of the corpus luteum, dosage with 1,500 I.U. p.m.s. failed to produce ovulation although 2–3 large follicles developed. In similar circumstances a dose of 5,000 I.U. produced up to 48 large follicles in a single animal. Given at the end of the cycle, 1,500 I.U. produced twin ovulations fairly frequently, while 5,000 I.U. produced up to eight ovulations. Given two days before expulsion of the corpus luteum a dose of 1,500 I.U. appreciably affected the ovulation rate but was almost without effect when given one day after. A dose of 5,000 I.U. seemed to produce multiple ovulations at all stages of the cycle provided it was administered before the corpus luteum was expelled.

Slaughter of 17 of the animals was postponed long

enough to allow them to conceive or to calve. Seven of these developed multiple pregnancies. The young tended to be of poor viability although one quite hardy set of triplets was produced.—F. L. M. Dawson.

Livesay, E. A., & Bee, U. G. (1945). **A study of the gestation periods of five breeds of cattle.**—*J. Anim. Sci.* **4.** 13–14. [Authors' conclusions copied *verbatim.*] **1850**

The breeding records of the Aberdeen Angus and Hereford herds at West Virginia University do not reveal the wide difference (16·2 days) between the gestation period of these two beef breeds as found at the Ohio Experiment Station. The difference in these breeds was 2·7 days. This difference, however, was highly significant.

The breeding records of the Jersey, Ayrshire and Holstein Friesian herds at this institution do not show that an early maturing breed like the Jersey has a shorter gestation period than slower maturing breeds. The data show a significantly shorter gestation period for the dairy breeds as compared with the beef breeds in the herds of this institution, the difference being 5·8 days.

Laing, J. A. (1945). **Observations on the effect of method of management at mating on bovine fertility.**—*J. agric. Sci.* **35.** 25–29. **1851**

The fertility records of 20 bulls divided into two groups, one group used for controlled service and one group for free service, were compared over a period of a year. Where controlled service was used, as soon as an animal was noticed in oestrus she was served twice, and not served again during the oestrous period. When free service was used, the animal was turned into a yard with the bull when the earliest signs of heat were noticed, and left with him till oestrus was over. Fertility was measured by the number of services required for each conception, based on diagnosis by rectal examination 50 days from the last date of service. Records were available of the average daily air temperature and of the duration of direct sunshine each day. Variations in fertility occurred throughout the year in both groups of bulls, but the fertility of the free-service group was consistently better except during December, January, February and March, when fertility was at the same approximate level in both groups. The author produces evidence which tends to show that the difference in fertility between the two groups for most of the year was correlated with the varying length of the oestrous period of the cows at different seasons of the year. For example, the fact that the widest difference in fertility occurred during June and July, when the weather was at its best, and the oestrous periods were probably longest, suggested that the difference between the two groups was due mainly to the closer timing of mating in relation to ovulation in the free-service group. —N. J. Scorgie.

Johnson, L. E. (1945). **The importance of uniformity of get in evaluating a sire.**—*J. Dairy Sci.* **28.** 109–120. [Author's summary copied *verbatim.*] **1852**

A study of the uniformity of 256 gets was made. The progenies differed significantly in uniformity, but only a small portion of this difference was attributable to sires. The small effect that sires exerted upon the uniformity of their gets was directly associated with their degree of inbreeding and was, therefore, non-hereditary as it could not be passed from sire to son in non-inbred populations.

The reduction in culls possible from selecting only sires that had previously produced highly uniform gets was too small to be worth considering in a breeding program. The additional increase in average production of a herd resulting from selecting only sires that had produced highly variable gets and culling a given percentage of the poorest daughters was likewise insignificant.

There appears to be no justification for considering the uniformity of fat records of progenies when selecting proved sires. Similar conclusions seem appropriate regarding selection for uniformity in any character which depends upon several gene pairs and which is not highly hereditary.

Zondek, B., & Sulman, F. (1945). **A twenty-four hour pregnancy test for equines. [Correspondence.]**—*Nature, Lond.* **155.** 302–303. **1853**

The test here described is based on the fact that within 24 hours following the injection of equine pregnancy serum, the ovaries of the infantile rat undergo a strong hyperaemic reaction accompanied by swelling. The method requires 3–10 times the amount of hormone administered in the previous pregnancy test for equines, but it has the advantage of giving clear-cut results with 99% reliability within 24 hours. It is possible to obtain a positive reaction with the hyperaemic test as early as 4–6 hours after the injection of the equine gonadotropin. The reaction at this early stage is positive, however, in only 33–50% of cases, whereas negative results cannot be evaluated. The test requires 20 ml. of serum from the mare. Four rats, 3–5 weeks old, 30–40 g. in weight are injected as follows: rats 1, 2, and 3 are injected twice daily at 2–4 hour intervals with 2·0 ml., 1·5 ml., and 1·0 ml., respectively, of the serum. Rat 1 is killed on the evening of the first day, at least six hours after the first injection and four hours after the econd injection. Rats 2 and 3 are killed on the second day, about 18–24 hours after the first injection. Rat 4 receives 2 × 0·5 ml. serum for four consecutive days, *i.e.*, a total of 4 ml. serum, and is killed five days after the first injection. The test is positive if both ovaries of at least one of the rats 1, 2 and 3 show a distinct red colour resembling that of the spleen or kidney. As a rule, all the rats react similarly. Autopsy of rat 4 takes into consideration vaginal oestrus and corpus luteum formation as in the original Aschheim-Zondek test and serves for control purposes only. It detects all cases of early pregnancy or late pregnancy where the blood gonadotropin titre is lowered. The hyperaemia test gives positive results with all sera containing more than 250 I.U. pregnant mare serum gonadotropin per litre. It may also be used for quantitative P.M.S. gonadotropin estimation, in addition to its use as a pregnancy test, thus facilitating the preparation of P.M.S. gonadotropin by making possible the bleeding of pregnant mares at the peak of hormone production.—N. J. Scorgie.

Bartlett, S., & Mackintosh, J. (1944). **The artificial insemination of cattle.**—*J. R. agric. Soc.* **105.** 175–189. **1854**

This is a popular exposition of the possibilities and limitations of artificial insemination as applied to the breeding of dairy cattle. The various procedures involved in the technique of artificial breeding, the official regulations operative in Great Britain and the function of the Central Advisory Committee, the organization required for the establishment and running of an artificial insemination centre, and the relation of artificial insemination to herd improvement, are adequately described and discussed. Two informative drawings illustrate the layout and certain details of the buildings erected for the artificial insemination centre at Shinfield, near Reading.—N. J. Scorgie.

White, A., & Dougherty, T. F. (1945). **Effect of prolonged stimulation of the adrenal cortex and of**

adrenalectomy on the numbers of circulating erythrocytes and lymphocytes.—*Endocrinology.* **36.** 16–23. **1855**

Normal mice were injected daily with 1·0 mg. of pituitary adrenotropic hormone and groups of six were studied at three-day intervals. There was an increase in red cells and in haemoglobin, an absolute lymphopenia, and an increase in polymorphonuclear leucocytes. Adrenalectomized mice were studied in groups of three at daily intervals for five days and an absolute lymphocyte and depressed polymorphonuclear leucocyte production was observed, together with a slight anaemia. Pituitary adrenotropic hormone maintains control over the numbers of circulating erythrocytes and lymphocytes, and variation in the numbers of these cells following a variety of unrelated stimuli, such as inanition, cold, anoxia, bacterial toxins, insulin, etc., may be explained by the responsiveness of pituitary adrenal cortical secretion to the same stimuli.—A. B. PATERSON.

SHANKLIN, W. M. (1944). **Histogenesis of the pig neurohypophysis.**—*Amer. J. Anat.* **74.** 327–353. **1856**

The tissue growth of the neurohypophysis in the pig was studied in embryos ranging in size from 10–270 mm. Differentiation of cellular growth was observed between the 10 and 15 mm. stages. Blood vessels first appeared at the 125 mm. stage and their subsequent growth determined to a large extent the course of the interlobular boundaries. Pituicytes were the most abundant cells, and the similarity between them and the developing astrocyte is discussed. It is suggested that the smaller cells with dark staining nuclei which appear at about the 125 mm. stage are microglia.
—C. W. OTTAWAY.

*RÖSSNER, G. (1940). Untersuchungen über die Verteilung von Hornröhrchen und Zwischenhorn in der Schutzschicht bei verschiedenen Wandstellungen am Hufe des Pferdes. [**Investigation of the distribution of the horn tubules and middle horn in the protective layer in different forms of the hoof in horses.**]—*Inaug. Diss., Hanover.* [Abst. from abst. in *Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* Nov. 12th. 400. (1943).] **1857**

In the protective layers of narrow and wide hooves, but not in different sections of the same hoof, there is a difference in the amount of middle horn present. The protective layer of a wide hoof contains more middle horn in proportion to horn tubules than the protective layer of a narrow hoof. The difference in the quality of the horn of narrow and wide hooves depends upon the amount of middle horn and the different structure of the individual horn tubules.—R. F. G. SANDERCOCK.

See also absts. **1817, 1894** (oestrogens and tumours), **1901** (cell content of milk), **1914** (biochemistry of fatty acids and lipoids), **1915** (physical biochemistry).

POISONS AND POISONING

*KOVÁCS, E. (1943). [**Arsenic poisoning in swine.**]—*Állatorv. Lapok.* **66.** 13. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* April 14th. 128. (1944).] **1858**

A group of 600 pigs was suddenly affected with symptoms of diarrhoea, apathy and incoordination following poisoning with calcium arsenate which was present in lucerne meal. Fatty degeneration of the liver, kidney and heart muscle was seen on P.M. examination of eight pigs which died. Treatment *per os* with ferric chloride and magnesia and with pentamethylenetetrazol (leptazol) by subcutaneous injection was successful.—E. BOYLAND.

MOXON, A. L. (1941). **The influence of arsenic on selenium poisoning in hogs.**—*Proc. S. Dak. Acad. Sci.* **21.** 34–36. **1859**

From experimental results M. found that As, as Na_2HAsO_3, when fed to pigs at the rate of 5 p.p.m. in the drinking water, counteracted the toxicity of Se fed at the rate of 9 p.p.m. in the ration. The Se and As content of the tissues indicated that the As prevents at least a part of the Se from entering the muscle tissues of the pig. The liver of a pig fed both Se and As contained more Se than the liver of a pig fed Se and no As. The theory has been advanced that some of the Se in the liver is bound there by the As in a non-toxic form, when Se and As are fed together.—E. M. J.

MOXON, A. L., RHIAN, M. A., ANDERSON, H. D., & OLSON, O. E. (1944). **Growth of steers on seleniferous range.**—*J. Anim. Sci.* **3.** 299–309. **1860**

In a seleniferous area the growth and market quality were compared of steers kept on under-grazed range, over-grazed range, normal range and normal range plus arsenic-salt (salt to which arsenic was added). The grazing period was for two years, starting as yearlings. The steers allowed less than normal range per animal made the poorest gains, but there was no marked advantage in allowing excess range. Steers receiving 25 p.p.m. of arsenic in the salt supplement made the best gains and sold at a slightly better price than the others receiving salt alone. Furthermore, the incidence of symptoms of selenium poisoning was reduced by this treatment. Values for the selenium content of organs and tissues on samples taken at the time of slaughter are given.—H. PAVER.

ANDERSON, H. D., & MOXON, A. L. (1941). **Isolation of glutathione and thioneine from the blood of selenized steers.**—*Proc. S. Dak. Acad. Sci.* **21.** 16–18. **1861**

Selenium in minute traces (0·1–3·0 p.p.m.) in animal tissues is sufficient to produce toxic effects. On account of this low concentration the metabolism of sulphur, a closely related element, has been studied and attempts to draw conclusions from comparative data have been made. Later it was found that most of the selenium was bound to the protein of the red blood cells. Thioneine and glutathione have been isolated from large quantities (approximately 25 gal.) of blood from selenized steers. The method of Hunter and Eagles modified to eliminate the use of H_2S in the separation of thioneine (sympectothion) was used. The greater portion of the selenium remained in the protein precipitates. In what form the selenium is bound to the protein fraction is not known. Some selenium is liberated from the protein by tryptic hydrolysis.
—E. M. J.

JENSEN, C. W., & ANDERSON, H. D. (1941). **Rate of formation and disappearance of methemoglobin following oral administration or injection of sodium nitrite.**—*Proc. S. Dak. Acad. Sci.* **21.** 37–40. **1862**

Many farm animals are lost each year as a result of oat hay poisoning. Animals dying from this have a high concentration of methaemoglobin in their blood. The iron of the haemoglobin molecule is transformed from a ferrous to a ferric state, an oxidizing action brought about by nitrites. Methaemoglobin has little or no oxygen-carrying capacity and therefore the animals die of anoxia.

The authors present the results of their work on dogs. When injections of sodium nitrite were made

subcutaneously on the back just above the shoulder, the maximum level of met-Hb occurred in about 80 minutes. In other dogs fasted 12 hours and then fed $NaNO_2$ in a capsule, the met-Hb formation reached a maximum in about 120 minutes. In both experiments most of the met-Hb had disappeared in about five hours. —E. M. J.

CRAWSHAW, H. A. (1944). **Nicotine poisoning in lambs.** —*Vet. Rec.* **56.** 276–277. **1863**

Accidental overdosing with a nicotine sulphate, copper sulphate solution, caused the death of 18 three-month-old lambs with an average weight of 37·2 lb. P.M., there was clearly defined arboration of the mesenteric vessels, the blood in them having almost the colour of carboxy-haemoglobin ; the rumen, reticulum and omasum were normal, but the oesophageal groove was clearly defined by a severe inflammation of the mucous membrane. The mucous membrane of the abomasum was intensely inflamed, while the outer surface of the caecum was dark blue, the mucous membrane being of the same colour with a purplish tinge. Nicotine could not be detected in the caecal contents.

It is concluded that the toxic dose of nicotine sulphate for lambs of this class lies between 3·2 and 4·8 grains.—H. PAVER.

PHARMACOLOGY, THERAPEUTICS AND DISINFECTION

HOMBURGER, F. (1945). **Epinephrine and tissue permeability.**—*Yale J. Biol. Med.* **17.** 479–482. [Author's summary copied *verbatim.*] **1864**

Epinephrine causes local and generalized reduction of skin permeability followed by local necrosis. These effects are prevented by ergotamine tartrate, which per se reduces skin permeability slightly. The presence of spreading factor does not interfere with the epinephrine effect but it does prevent local necrosis. A slight increase in skin permeability is observed in adrenalectomized rats.

SCHATZ, A., BUGIE, E., & WAKSMAN, S. A. (1944). **Streptomycin, a substance exhibiting antibiotic activity against Gram-positive and Gram-negative bacteria.**—*Proc. Soc. exp. Biol., N.Y.* **55.** 66–69. **1865**

Streptomycin is a new anti-bacterial substance isolated from two strains of organisms related to *Actinomyces griseus*. It is similar to streptothricin in its properties and action but is less active against *Staphylococcus aureus* and certain strains of *Salmonella*. It is more active against *Bacillus mycoides, Bacillus cereus, Mycobacterium phlei, Chromobacterium prodigiosum,* two strains of *Pseudomonas* and *Clostridium butyricum.*—E. BOYLAND.

JONES, D., METZGER, H. J., SCHATZ, A., & WAKSMAN, S. A. (1944). **Control of Gram-negative bacteria in experimental animals by streptomycin.**—*Science.* **100.** 103–105. **1866**

Injections of 6·4 mg. of streptomycin into mice protected them against lethal infections of *Salmonella schottmülleri,* and of *Pseudomonas aeruginosa.* Injection of 5 or 10 mg. of the material protected 11-day-old chick embryos from lethal infections of *Salmonella gallinarum,* and prevented the growth of *Brucella abortus* on chick embryos. Streptomycin gave complete protection of animals to *Proteus vulgaris* infections. —E. BOYLAND.

HEATLEY, N. G. (1944). **An antibiotic from *Crepis taraxacifolia* (Thuill.).**—*Brit. J. exp. Path.* **25.** 208–211. **1867**

Crepin, an antibiotic isolated from the flowers and buds of " beaked hawksbeard ", has been crystallized and appears to have the empirical composition $C_{14}H_{16}O_4$. Crepin inhibits *Staphylococcus aureus in vitro* in dilutions of 1 : 32,000 ; higher concentrations are required to inhibit the growth of *Streptococcus pyogenes, Bacillus subtilis, Pseudomonas pyocyanea* and *Salmonella typhi.* The inhibitory action was neutralized to some extent by serum but not by peptone.—E. BOYLAND.

*MIETZSCH, F., & KLARER, J. (1942). Zur Entwicklung der Chemotherapie auf dem Gebiete der Azo- und Sulfonamidverbindungen. **[Development of chemotherapy with azo and sulphonamide compounds.]**—*Abh. med.-chem. Forschstätten I. G. Farbenindustrie A.-G.* **4.** 73–81. [Abst. from abst. in *Jber. Vet.-Med.* **71.** 193–194.] **1868**

The course of the research based on the alkylaminoalkyl group of morphine is traced. Various important derivatives were made by the addition of chemical groups *e.g.*, some of the local anaesthetics and antimalarials. In 1932 the sulphonamide group was investigated and complex compounds containing it were made. It was then found that single sulphonamide compounds had the same or even greater antibacterial action, *e.g.*, prontosil, and later, sulphanilamide. The activity of uleron and various derivatives is discussed. More than 500 azo compounds and 2,500 colourless sulphonamide compounds were made and tested by the chemists at Elberfeld in the period 1937–1942.—J. M. R.

LEVADITI, C., MENTZER, C., & PÉRAULT, R. (1942). Vitamines H' antisulfamide et antisulfone. **[Anti-sulphonamide action of *p*-aminobenzoic acid.]**—*C. R. Soc. Biol. Paris.* **136.** 769–771. **1869**

p-Hydroxyphenyl-4-azobenzoic acid and the hydrazide of *p*-aminobenzoic acid have some antagonistic action to sulphapyridine, but they are much less active than *p*-aminobenzoic acid. The bacteriostatic action of 4,4'-*p*-hydroxydiphenyl sulphone is antagonized by *p*-hydroxybenzoic acid.—J. M. ROBSON.

THORP, W. T. S. (1945). **The newer sulfonamides in veterinary practice.**—*J. Amer. vet. med. Ass.* **106.** 75–82. **1870**

Clinical observations on various sulphonamides are recorded. Calf pneumonia and calf scours were the main conditions against which the drugs were tested. Details are given of 33 cases of calf pneumonia treated with sulphathiazole, 12 with sulphadiazine, and 16 with sulphamerazine. From these studies it is claimed that sulphathiazole is less toxic and just as efficient as sulphadiazine in treating this condition. Sulphamerazine is also claimed to have high efficiency. Studies on sulphaguanidine confirm its efficiency in the treatment of calf scours and sulphathalidine is also shown to give satisfactory results. In coccidiosis of poultry and other animals, sulphaguanidine is more effective clinically than either sulphasuxidine or sulphathalidine. Sulphaguanidine and sulphathalidine appear to have about equal clinical efficiency when administered both with and without vitamin supplements in cases of swine enteritis.—D. D. OGILVIE.

STABLEFORTH, A. W. (1945). **Sulphonamides in veterinary practice.**—*Vet. Rec.* **57.** 3–6. Discussion pp. 6–7. **1871**

A general review is given of the sulphonamides in common use in veterinary practice in Britain and America. The pharmacology, dosage, toxicity and clinical application of sulphanilamide, sulphacetamide, sulphapyridine, sulphathiazole, sulphadiazine, sulphamezathine, sulphaguanidine, and succinyl sulphathiazole

are discussed. Part of the review is devoted to a general consideration of the mode and range of action of sulphonamides against animal infections. A plea is made for further research on both the experimental and clinical aspects of the subject.—D. D. OGILVIE.

I. ROBERTS, S. J. (1944). **Results of examination and treatment of mastitis in the ambulatory clinic.**—*Cornell Vet.* **34.** 131–140. **1872**

II. MCAULIFF, J. (1944). **Discussion following presentation of papers by Dr. Johnson** [see *V. B.* **15.** 167] **and Dr. Roberts.**—*Ibid.* 140–142. **1873**

III. GREENE, H. R. (1944). **Discussion.**—*Ibid.* 142–144. **1874**

I. R. reports 178 cases of mastitis in different herds. The incidence of *Streptococcus agalactiae* infection was somewhat lower than that usually reported, and that due to staphylococci somewhat higher. The cases were divided clinically into septic, acute or subacute, and chronic mastitis.

Septic mastitis was caused chiefly by staphylococci and unidentified " green " streptococci. In the 11 out of 21 cases that recovered most of the infected quarters were destroyed and had to be dried up ; this was done by leaving 50–100 ml. of a 1–3% solution of silver nitrate in the quarter for two to three weeks and then milking out. In acute or subacute mastitis staphylococci and " green " streptococci predominated. In chronic mastitis staphylococci were most commonly found, with an equal number of cases due to " green " streptococci and *Str. agalactiae.*

Treatment included intramammary infusion with 500–1,000 ml. of 1 : 6,000 solution of acriflavine, 20–40 ml. of tyrothricin and 50–120 ml. of a 30% suspension of sulphanilamide in oil, the latter giving the best results with all types of mastitis. One, two or three treatments were given according to the degree of infection. Results were assessed on clinical, not bacteriological improvement. Staphylococcal infections proved the most resistant to treatment. R. considers the treatment by intramammary infusion to be disappointing in its results and discusses some of the reasons for this.

II. The author treats septic mastitis by infusion with 100–150 ml. of sulphanilamide in oil, sulphanilamide powder given *per os,* and ice-packs on the udder. Milder cases receive the infusion only repeated four times at intervals of 24–48 hours. *Streptococcus agalactiae* infection is treated with tyrothricin ; this is left *in situ* for 12–24 hours, and treatment is repeated after 5–7 days. Mild chronic cases are infused with 1 : 4,000 acriflavine in 10% sugar solution, a preliminary rinse of 250 ml. being followed by a main infusion of 500 ml. which is left in the udder for 30 minutes.

Dry cows are treated with 5% silver oxide in oil, or acriflavine. Teat and udder injuries are treated locally with sulphathiazole and allowed to dry off ; according to the author, this does not affect the yield at the next lactation.

III. G. treated 1,142 quarters in 838 cows chiefly by infusion. Acriflavine was most commonly used, results with sulphanilamide in oil being disappointing. He suggests the use of a base from which the sulphanilamide can be more easily freed. Tyrothricin and gramicidin were used on dry quarters.—R. M. L.

KÄSTLI, P. (1944). Behandlung des gelben Galtes der Milchkühe mit einer Cibazol-Emulsion. **[Treatment of bovine mastitis with a sulphathiazole emulsion.]**—*Schweiz. Arch. Tierheilk.* **86.** 130–144 & 187–201. **1875**

40–50 ml. of an emulsion of sulphathiazole, warmed to body temperature, were infused into each quarter of the udders of infected cows ; the quarters were then massaged and stripped 7–8 hours later. The results obtained were not entirely satisfactory in that many cases of typical mastitis were not cured. This treatment, however, did not have such severe ill effects as treatment with acridine derivatives or other antiseptics. Further experiments are in hand to try to increase the effectiveness of sulphonamide treatment.—E. BOYLAND.

MUNTIU, N. (1943). Schutzwirkung des Sulfathiazols bei akzidentellen und experimentellen Rotzinfektionen (vorläufige Mitteilung). **[Treatment of glanders with sulphathiazole. (Preliminary note.)]**—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **51/49.** 361. **1876**

Five g. pigs were inoculated with large doses of a virulent culture of *Pfeiferella mallei,* treatment with sulphathiazole, administered *per os,* commencing one hour later. The drug was given twice daily in doses of 1 g. per kg. body weight on the first day, dropping to 0·1 g. per kg. on the sixth day. Three animals remained healthy, one developed orchitis but recovered under further treatment, and one died from an intercurrent infection. Four controls all died within 15 days. Since the glander's bacillus could be recovered from the site of inoculation in three animals, and from the orchitis in the fourth treated animal, it is suggested that sulphathiazole is bacteriostatic and not bactericidal in respect of the glanders' bacillus. It is thought the drug may be valuable as a safeguard against human laboratory infections.—U. F. RICHARDSON.

*CUGNINI, I. (1942). Sull'attivita antibatterica di un nuovo derivato sulfamidico (salicil-azo-sulfamidopiridina) verso i germi del gruppo tifo-coli. **[Antibacterial action on the salmonella and coliform bacteria of a new sulphonamide (salicyl-azo-sulphapyridine).]**—*Ann. Pat. trop. Parassitol.* **3.** 432–440. [Abst. from abst. in *Jber. Vet.-Med.* **71.** 195.] **1877**

This compound showed an appreciable antibacterial effect *in vitro* against the bacteria, but no bactericidal effect was obtained. The compound was incorporated in concentrations of 0·2% or less in agar, on which the bacteria were grown. The most marked effect was against *Salmonella paratyphi A,* less against *S. paratyphi B* and *Bacterium coli,* and least against *S. typhi.* The colonies became smaller and more delicate, and ultimately became quite transparent.—J. M. ROBSON.

GRAHAM, R., PETERSON, E. H., MORRILL, C. C., HARDENBROOK, H. J., WHITMORE, G. E., & BEAMER, P. D. (1945). **Studies on porcine enteritis. 1. Sulfathalidine therapy in treatment of natural outbreaks.**—*J. Amer. vet. med. Ass.* **106.** 7–13. **1878**

In a series of experiments the authors demonstrated the efficacy of sulphathalidine (phthalylsulphathiazole) in the treatment of naturally occurring outbreaks of porcine enteritis. The daily doseage was from 0·25 g. to 0·5 g. per 10 lb. body weight. The smaller dose rate was used for adult pigs, the larger for young pigs. Because of its low solubility the drug has no influence on the pneumonic lesions which may occur in association with porcine enteritis.—J. A. J. VENN.

MCKEE, C. M., HAMRE, D. M., & RAKE, G. (1943). **The action of antibiotics on organisms producing gas gangrene.**—*Proc. Soc. exp. Biol., N.Y.* **54.** 211–213. **1879**

A strain of *Clostridium welchii* made resistant to sulphathiazole, and other strains of *Cl. welchii, Cl. septicum* and *Cl. oedematiens* were incubated for 16–18 hours at 37°C. in broth containing antibiotics in varying concentrations, and for the same time, in McLeod's medium containing sodium thioglycollate, in presence of varying concentrations of sulphonamides. The bacteriostatic properties, in decreasing order, of the

antibiotics and sulphonamides, together with the smallest amounts inhibiting growth, were tyrothricin (0·05 μg. per ml.), penicillin (0·3 μg. per ml.), sulphadiazine (7·0 μg. per ml.), sulphathiazole (25 μg. per ml.), aspergillic acid (40 μg. per ml.), gliotoxin (100 μg. per ml.) and sulphanilamide (150 μg. per ml.). The sulphathiazole-resistant *Cl. welchii* was inhibited *in vitro* by penicillin at 0·135 μg. per ml. and by aspergillic acid at 7·6 μg. per ml.

When injected locally into mice infected by intramuscular injection with 0·05 ml. of a 10^{-1} dilution of a six-hour culture of *Cl. welchii*, penicillin and sodium sulphadiazine were more effective than aspergillic acid. Gliotoxin and tyrothricin were not effective in doses of 1 mg. in sesame oil.—Alex. B. Paterson.

Melville, K. I., & Stehle, R. L. (1944). **Chemotherapy in experimental tuberculosis.**—*Canad. J. Res.* Sect. E. **22.** 95–121. [Authors' abstract copied *verbatim*.] **1880**

Seventy-nine compounds comprising 22 *p*-aminobenzene derivatives, 10 *o*-aminobenzene derivatives, 11 *m*-aminobenzene derivatives, 8 *p*-N-ethylaminobenzene derivatives, 10 isomeric hydroxychloroanilines, 3 diaminodiphenylsulphones and 15 miscellaneous agents, have been compared for their effects upon the course of experimental tuberculosis in guinea pigs inoculated intraperitoneally with virulent human tubercle bacillus (Strain *H* 37 *R.V.*). Sixty-five of these compounds gave entirely negative results. On the other hand, 14 of the agents tested, namely, *p*-aminophenol, *p*-ethylaniline, *p*-chloroaniline, *p*-aminophenyl hexyl ether, ethyl-*p*-aminobenzoate, 2,4-dichloroaniline, *p*-N-ethylaminophenol, 3-chloro-4-hydroxyaniline, 2-chloro-4-hydroxyaniline, 2-chloro-5-hydroxyaniline, 2-hydroxy-3-chloroaniline, promin, rodilone, and sulphathiazole led, in a number of different experiments, to varying degrees of prolongation of the survival time of some of the animals treated with them, in comparison with both untreated controls and animals treated with other agents. The average survival times of all the animals treated with these agents were also prolonged in several different series of experiments in which each of these agents was tested. None of the latter agents led to a curative effect and all animals both treated and untreated, however long they survived, showed at autopsy gross evidence of tuberculosis involving spleen, liver, lungs and glands. Finally it must be emphasized that none of these compounds offer any promise as a cure for tuberculosis, but the results described would suggest that further investigation of chemical agents related to these substances might be worthwhile.

I. Saunders, G. F. T. (1941). **Preliminary report on the treatment of sleeping sickness by 4 : 4′-diamidino diphenoxy pentane.**—*Ann. trop. Med. Parasit.* **35.** 169–174. [Author's summary slightly amended.] **1881**

II. Saunders, G. F. T., Holden, J. R., & Hughes, M. H. (1944). **Second report on the treatment of trypanosomiasis by pentamidine.**—*Ibid.* **38.** 159–168. **1882**

I. Details are given of fourteen cases of sleeping sickness treated with 4 : 4′-diamidino diphenoxy pentane. In all cases the peripheral blood was sterilized by four injections of the drug. Seven out of 10 central nervous system cases were possibly cured. Of these, one was very advanced. Up to 65 injections were given without ill-effects. All cases which were apparently cured, except one, were symptomless after, at most, 20 injections. Early cases appeared to be cured. Untoward results were trivial.

II. Details are given of nine follow-up and 12 new cases of trypanosomiasis in the human subject treated with pentamidine. The results were variable, being dramatically favourable in some cases and entirely negative in others. Cases with a cerebrospinal fluid cell count of less than 30 cells per cu. mm. were generally cured. One relapse occurred in eight cases studied. In cases with counts over 30 cells per cu. mm. early results were variable but eventually most relapsed. In advanced cases the drug was ineffective. Pentamidine proved safe to use, the dose employed being in the region of 10–37 injections commencing at 0·02–0·04 g. daily and gradually increasing to 0·06–0·1 g. daily. Rapid administration caused severe and dangerous decline in blood pressure, but this decline was minimal and of no practical consequence if the drug was injected very slowly.—D. D. Ogilvie.

Coatney, G. R., & Cooper, W. C. (1944). **The prophylactic effect of sulfadiazine and sulfaguanidine against mosquito-borne *Plasmodium gallinaceum* infection in the domestic fowl (preliminary report).**—*Publ. Hlth Rep., Wash.* **59.** 1455–1458. **1883**

Sulphadiazine was administered to chicks at a dosage of 1·0 mg. per g. live body weight twice daily for eight days and at a dosage of 0·5 mg. per g. for four days. The treatment was started two days before the chicks were infected by being bitten by *Aëdes aegypti* which were carrying *P. gallinaceum*. None of these birds developed malaria.

Sulphaguanidine was tested in the same way. Twelve birds received the lower dosage and five of them became infected after being bitten. Of the 20 birds receiving the higher dosage two became infected. Twenty-seven of the 34 control birds became infected. The authors believe that sulphadiazine has definite prophylactic action against mosquito-borne *P. gallinaceum* infection in the chick but that sulphaguanidine at the same oral dosage is much less effective.—C. H. S.

Christensen, J. F. (1944). **Sulfur prophylaxis of coccidiosis of feeder lambs.**—*Amer. J. vet. Res.* **5.** 341–345. **1884**

A large-scale experiment was undertaken to observe the prophylactic efficacy of ground crude sulphur against naturally acquired coccidiosis of feeder lambs, elemental sulphur having previously been shown to have a coccidiostatic effect on poultry. The period of expectation of clinical coccidiosis in feeder lambs is so well known that prophylactic feeding of the chemical could be confined to a fairly well-defined period. The cost of such prophylactic feeding would be much lower than that of sulphaguanidine, which is known to have a prophylactic value against clinical coccidiosis. The experiment showed that 0·5–3·0% commercial flowers of sulphur in the ration prevented the development of clinical coccidiosis in 800 naturally infected lambs. The 600 untreated controls, however, were only mildly infected. Although no visible harmful effects were evident in lambs which had received continuous treatment for 72 days with sulphur in amounts of 0·5–1·5% in the ration, higher proportions of sulphur produced a laxative effect and a decline in weight gain. The death rate of the lambs fed 0·5–1·5% sulphur was low and the rate of fattening compared favourably with that of the untreated controls.—C. Horton Smith.

Ebbell, H. (1943). Die Bekämpfung der Geflügel-Kokzidiose im Lichte neuer Forschungsergebnisse. **[Control of avian coccidiosis.]**—*Schweiz. Arch. Tierheilk.* **85.** 118–125. **1885**

E. describes the conditions which favour outbreaks of coccidiosis in Switzerland. The chief causes of prevalence are the lack of space so typical of the Swiss breeding and rearing stations and the undue emphasis laid on production at the expense of the vitality of the

stock. After summarizing existing knowledge, E. refers to the American findings that flowers of sulphur are prophylactic against coccidiosis. Since 1938, E. had experimented with 2% sulphur plus 5% charcoal mixed in the food, treatment being started when the chicks were four weeks old. The medicated ration was offered for a fortnight and the birds showed no obvious ill-effects. In 1942, 2,500 chickens were fed the medicated ration and appeared healthy after six weeks on this diet. A slight outbreak of coccidiosis was suppressed. E. recommends that sulphur should be fed as soon as coccidiosis is suspected, that strict hygiene should accompany treatment and that birds showing signs of coccidiosis should be killed. Food containing 2% flowers of sulphur plus 5% finely ground charcoal should be given from the fourth week of age and continued for 4–6 weeks. Sufficient vitamin D_3 must be fed to prevent rachitis and the chicks should have access to direct sunlight. In respect of disinfectants E. confirms the report of SECK & SCHUHMACHER (1941) that "eimeran" kills sporulated and unsporulated oocysts in 15 min.—C. HORTON SMITH.

SWALES, W. E. (1944). **On the chemotherapy of caecal coccidiosis (*Eimeria tenella*) of chickens.**—*Canad. J. Res.* Sect. D. **22.** 131–140. **1886**

These experiments confirm the findings of HORTON SMITH & TAYLOR [see *V. B.* **13.** 187 & 304]. Definite prophylactic and curative action was demonstrated for sulphamethazine against *Eimeria tenella*. The monomethyl counterpart, known as sulphamerazine, both in its relatively insoluble form mixed in dry mash, and as a soluble sodium salt in drinking water, had a comparable value in inhibiting the development of established infections. The drug in saturated aqueous solution (0·2%) in place of drinking water appeared to be non-toxic when treatment extended over a period of five or even seven days. There was some suggestion of harmful results when the drug was given for 10 days. A coccidiostatic effect is probably brought about by the inhibition of one or more stages in the life-cycle of the parasite.—R. GWATKIN.

ALLEN, E. A. (1944). **The status of vinegar in the control of coccidiosis in chickens.**—*Vet. Med.* **39.** 389–391. **1887**

A. concludes that a vinegar solution containing 1 part vinegar to 79 parts of water used in the place of ordinary drinking water does not control caecal coccidiosis. The treatment does not lower the hydrogen-ion concentration of the caeca or that of other portions of the alimentary tract.—C. HORTON SMITH.

PAULI, C. (1943). Die "Kaninchensyphilis" und ihre Behandlung. **[Treatment of rabbit spirochaetosis.]**—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **51/49.** 348–349. **1888**

The importance and symptoms of rabbit syphilis are described, and neosalvarsan is recommended for treatment. The infected animal should be isolated and given intramuscularly one dose of 0·1–0·15 g. of neosalvarsan dissolved in 1·5 ml. of water. It is emphasized that solutions must be used fresh or they become toxic, and that a higher dose causes local irritation which may lead to self mutilation which is difficult to treat. After treatment recovery occurs in about 14 days.—U. F. R.

HEILMAN, F. R., & HERRELL, W. E. (1944). **Penicillin in the treatment of experimental ornithosis.**—*Proc. Mayo Clin.* **19.** 57–65. **1889**

Three experiments were made, in which altogether eighty mice were inoculated intracranially or intra-abdominally with a strain of ornithosis virus of pigeon origin. Forty of the mice were given subcutaneously 1,000 units daily for seven days of sodium penicillin in graded doses. Only two of these mice died, whereas 35 of the 40 untreated mice died within 30 days after infection. Further work is necessary on the effect of penicillin on other strains of the ornithosis virus, before its possible therapeutic effect in cases of such infection in man can be assessed.—G. J.

GREIFF, D., PINKERTON, H., & MORAGUES, V. (1944). **Effect of enzyme inhibitors and activators on the multiplication of typhus rickettsiae. I. Penicillin, para-aminobenzoic acid, sodium fluoride, and vitamins of the B group.**—*J. exp. Med.* **80.** 561–574. [Authors' summary copied *verbatim*.] **1890**

By injection into typhus-infected yolk sacs, a number of agents were tested for possible inhibition or acceleration of rickettsial growth. The previously reported rickettsiostatic activity of penicillin was further confirmed.

Para-aminobenzoic acid, in single injections of 6·6 mg. and 3·3 mg. giving initial concentrations of approximately 1 : 6,000 and 1 : 12,000 was found to have rickettsiostatic activity approximately equal to that of penicillin. No conclusion could be drawn regarding the possibility of a synergistic action of para-aminobenzoic acid and penicillin. Para-aminobenzoic acid neutralized with sodium hydroxide was found to be as effective as the acid itself, when given in single injections of 6·6 mg. Sodium benzoate, as well as the ortho and meta forms of aminobenzoic acid were found to be ineffective when given in similar amounts.

Para-aminobenzoic acid, when added to the food in a concentration of 3 per cent, was shown to have a remarkably effective chemotherapeutic action on murine typhus infection in mice.

Sodium fluoride was found at times to accelerate the growth of rickettsiae in the yolk sac, and to cause heavy infection under conditions such that the controls showed practically no multiplication of the organism. When rickettsiostatic substances (penicillin and para-aminobenzoic acid) were combined with sodium fluoride, their rickettsiostatic activity was not demonstrably changed. Other agents studied and found not to affect rickettsial multiplication are listed. The possible mechanisms involved in the observed inhibition and stimulation of rickettsial growth under these conditions are discussed.

WIESMANN, R. (1943). Eine neue, wirksame Methode der Bekämpfung der Fliegenplagen in Ställen. **[Control of flies in animal houses.]**—*Schweiz. Arch. Tierheilk.* **85.** 24–36. **1891**

W. describes experiments made in 1942 using a 1% gesarol [D.D.T.] emulsion as a spray in cowsheds etc., for the control of the various species of biting and non-biting flies commonly found in such buildings. The toxic action of the spray persisted on the walls and roof for 5–6 weeks. Fresh flies entered the buildings from adjacent manure heaps but they were killed overnight. W. claims that the nuisance effect of the biting flies was very much reduced, the cows remaining quiet during milking. [It is not made clear as to whether the cows were kept in the sheds throughout the experiment, but no mention is made of the cows carrying a fly population into the buildings. No figures are given of the fly population in the control sheds.]—J. B. CRAGG.

MACKE, E. A. (1943). Die Manga auf der Estancia. **[Cattle dipping in Argentina.]**—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **51/49.** 239–240. **1892**

This is merely a description of the apparatus and procedure used in connexion with cattle dipping in the Argentine.—J. B. CRAGG.

SCHMID, G. (1944). Beitrag zur Bekämpfung der Pferde-Strongylose. **[Control of strongyle infestation**

in horses.]—*Schweiz. Arch. Tierheilk.* **86.** 98–105. **1893**

S. employed phenothiazine in divided doses for the treatment of strongylosis in horses. Five horses were given daily doses of 10 g. phenothiazine for periods ranging from 3–6 days. In no case was any ill-effect noticed and in all cases worm eggs were absent from the faeces after treatment. In 12 other horses, doses of 5–10 g. each day for 4–6 days reduced the egg counts to a low level or to zero. In only one case was the count high after treatment, in a 13-year-old gelding which was given six daily doses of 5 g. each. Before treatment the egg count of this horse was 1,764 per g. of faeces and after treatment it was 916. There were no significant changes in the weight, blood picture, and albumin content of the urine of two horses not affected with strongylosis, and given 10 g. daily for 5 days and 15 g. daily for 6 days respectively.

S. concludes that divided doses of phenothiazine are effective for the removal of strongylid worms from horses and that such doses do not cause anaemia or other ill-effects. The optimum doses recommended are 4–5 daily doses of 10 g. for adult horses, and 4–6 daily doses of 5 g. for foals six months to two years old. —T. E. GIBSON.

SMYTHE, R. H. (1945). **The treatment of certain canine neoplasms by stilboestrol.** — *Vet. Rec.* **57.** 115. **1894**

S. describes the striking alleviation of symptoms and the decrease in size of the tumours in three dogs with neoplasms presumed to be adenomas and appearing as an anal tumour, prostatic enlargement and suppurating mammary tumours, by the administration of stilboestrol dipropionate (15 mg. subcutaneously twice weekly, together with 3 mg. daily *per os*) over a period of 3–4 weeks. This treatment was used successfully on a number of occasions in dogs with anal tumours. He also states which type of growth he believes to be mainly confined to male dogs.—E. G. W.

SCHLAAK. (1943). Die Behandlung von Gelenkverletzungen mit Prontosil. **[Treatment of joint injuries with prontosil.]**—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **51/49.** 144–145. **1895**

All joint injuries referred to an army veterinary company over a period of six months were treated with prontosil injected through a hypodermic syringe. The best place of injection is opposite the injury, so that liquid injected may flow from the wound. After passive movement of the joint, prontosil is seen in the wound which is then sutured and a further injection is given. Of 16 animals with injuries to the heel joint, 12 were cured; in the other four cases there were complications.—A. J. MEE.

SUBY, H. I. (1944). **Dissolution of urinary calculi.**— *Proc. R. Soc. Med.* **37.** 609–619. Discussion pp. 619–620. **1896**

A solution containing 32·25 g. citric acid ($1H_2O$), 3·84 g. anhydrous magnesium oxide, and 4·37 g. anhydrous sodium carbonate in 1 litre of water was found effective for the dissolution of urinary calculi composed of $Ca_3(PO_4)_2$, $CaCO_3$ and $MgNH_4PO_4$. The solution is administered through a nephrostomy tube, or a ureteral or urethral catheter, and continuous irrigation is maintained for periods of several hours over a number of weeks.—ALEX. B. PATERSON.

*DOMAGK, G. (1942). Bedeutung der allgemeinen und lokalen Behandlung infizierter Wunden mit Sulfonamiden. **[General and local treatment of infected wounds with sulphonamides.]** — *Abh. med. chem. Forschstätten I. G. Farbenindustrie A.-G.* **4.** 82–129. [Abst. from abst. in *Jber. Vet.-Med.* **71.** 194–195.] **1897**

On the basis of many animal experiments and clinical findings D. discusses the treatment of infected wounds. The administration of prontosil or tibatin will prevent the development of sepsis in animals inoculated subcutaneously or intraperitoneally with haemolytic streptococci. If treatment is delayed some sepsis develops but is then localized and dealt with by the natural defences of the body. Local sulphonamide treatment is especially of value in prophylaxis; even large doses do not interfere with the function of leucocytes and histiocytes. Uleron C and sulphathiazole are recommended for staphylococcal infections. Marfanil is of great value in gas gangrene infections and also in β-haemolytic streptococcal infections. The following suggestions are made for the treatment of wounds:

(1) Early local application of 5–20 g. of a marfanil-prontalbin mixture, repeated when the wound is redressed. (2) If there is any fear of systemic infection, oral administration of 3–6 g. marfanil-prontalbin per day. (3) When gas gangrene is suspected, local chemotherapy as above and oral administration of marfanil; when gas gangrene is already present, injection also of a polyvalent serum. (4) Appropriate surgical treatment is, of course, necessary. Chemotherapeutic treatment should not be given continuously for more than a week. —J. M. ROBSON.

See also absts **1787** (treatment of canine babesiasis), **1811** (of mange in goats), **1827** (of gastro-intestinal diseases in swine), **1858** (of arsenic poisoning), **1859**, **1860** (of Se poisoning), **1804** (dermatitis from disinfectants), **1863** (anthelmintics), **1909** (sterilization of sulphonamides).

HYGIENE, PUBLIC HEALTH AND VETERINARY SERVICES

SAVAGE, W. (1944). **Current questions of milk supply.** —*J. R. sanit. Inst.* **64.** 117–121. Discussion pp. 121–125. **1898**

The present milk legislation is considered unsatisfactory as it does not ensure a safe supply. The Milk and Dairies Order, 1926, is too vague, and only encourages the production of clean milk. The Milk (Special Designations) Regulations, 1936–1943, are good in that they recognize pasteurized and encourage tuberculin-tested milk, but accredited milk is no safer than unstandardized milks, and the procedure of sampling milk for tubercle bacilli and then eliminating the infected cow takes too long.

The white paper of 1943 on measures to improve the quality of the nation's milk supply proposed that areas be scheduled where only heat-treated, T.T., or milk from a single accredited herd may be sold. The proper pasteurization of milk is the only possible way of obtaining a safe supply, as T.T. milk may convey milk-spread diseases other than tuberculosis. The use of accredited milk can only be considered as a temporary stopgap. The number of veterinary inspections given to each herd per year is unimportant, as these inspections have little effect in eradicating disease.

The milk-testing scheme to grade milk according to its keeping properties must be extended; if unsatisfactory milk is penalized great improvements are likely to result. If the production and quality testing are taken over by the Ministry of Agriculture, the health authorities must be given powers to sample all milk to be pasteurized and to reject what is unsuitable. The position of T.T. and accredited milk is a little obscure,

but as such milk may be consumed raw, supervision should remain with the health authorities.

In the subsequent discussion, speakers doubted the importance of the pre-pasteurization count, but emphasized the importance of efficiently testing the pasteurizing plant. It was considered that the milk of any herd found to be giving tuberculous milk should be pasteurized until the diseased animals are detected and removed from the herd.—J. O. L. KING.

HILLESUND, C. M. (1943). Litt om den laboratoriemessige kontrollen slik som den utføres ved Oslo Helseråd. [**Milk control in Oslo.**]—*Norsk VetTidsskr.* **55.** 104–113. **1899**

Recent improvements in milk inspection technique in Oslo are described. Samples of all milk entering the city are taken twice weekly and examined by the reductase test, for bacterial contamination (plate count), for *Bacterium coli* and for mastitis streptococci. The technique is described.

In 1940 it was decided to pasteurize all raw milk entering Oslo for sale. Inspection tests of pasteurized bottled milk include the total bacterial colony count, the *Bact. coli* count, Skar's test, the phosphatase test and fat estimation.

Milk for babies is supplied without heat treatment from only one producer. It is subjected to tests for bacterial contamination, *Bact. coli* and mastitis streptococci, for fat and by Skar's test.—J. E.

BARKWORTH, H. (1944). **Advisory dairy bacteriologists. Papers published from 1925 to 1943.**—*Dairy Indust.* **9.** 100–106, 171–180, 409–418, & 791–803. **1900**

A comprehensive survey of the work undertaken in the U.S.A. by dairy bacteriologists, from their first appointment in 1925 until 1943. Subjects dealt with include pasteurization, the resazurin and methylene-blue tests and mastitis.—S. M. G.

DURAN-JORDA, F. (1944). **Cell contents of milk.** [**Correspondence.**] — *Nature, Lond.* **154.** 704–705. **1901**

The author shows that a number of the fat droplets in colostrum are not produced by the mammary gland, but are carried there by cells. Samples of human and bovine colostrum were centrifuged and wet films were stained with methylene-blue and dry by May-Grünwald-Giemsa. In the wet smears there were large polymorphs with their cytoplasm formed by small fat droplets, mononuclears, some three times the size of the polymorphs containing similar fat droplets of varying size, and mononuclears containing a small number of fat droplets, in some cases only one. In the dry films the appearances were similar but the three main groups seen in the wet films were linked by intermediate cells. It is concluded that the polymorph neutrophile carrying the fat changes its nuclear morphology and its size before it commences secretion, and, after expelling the fat droplets, resembles a lymphocyte.—J. O. L. KING.

MORRIS, C. S. (1945). **Presence in raw cow's milk of a bactericidal substance specific for certain strains of coliform organisms.** [**Correspondence.**]—*Nature, Lond.* **155.** 22. **1902**

Certain strains of coliform organisms did not reduce methylene-blue or resazurin when inoculated into raw "sterile" milk. It was found that such strains were actually destroyed in milk held at 37°C. for six hours.

Destruction of the organisms was not caused by bacteriophage. It was shown to be due to the presence of a bactericidal substance which is completely destroyed by heating to 53°C. for half an hour; this destruction is critical to within 1°C.

The strains, all of which had originally been isolated from raw milk, were tested by recognized differential tests. The majority were intermediate types.—M. C.

WILLIAMS, E. M., & MILNE, R. L. (1943). **The wartime increase in tuberculous meningitis in relation to infection from milk.**—*Tubercle, Lond.* **24.** 113–116. **1903**

An attempt was made to determine how far the marked increase in the incidence of human tuberculous meningitis in Wales during 1940–42 was attributable to the increased contamination of milk with bovine tubercle bacilli. During the years 1924–1942, 115 cultures of tubercle bacilli from specimens of cerebrospinal fluid were typed, of which only 7·8% were bovine. No bovine strains were isolated before 1936, nor from 65 adult patients. In patients under 16 years of age, 55% of cases were primary infections, yielding 12% of bovine strains, and 45% were terminal infections, yielding 18·5% bovine strains. These figures do not indicate milk infection as particularly related to meningitis, but to childhood primary infection as a whole.

During 1940 and 1941, cultures were made from tuberculous lesions in 12 P.M. examinations in children, all three years of age or under; 86% of the cases where the primary lesions were abdominal yielded bovine strains. During 1929–41, 50 detailed P.M. examinations were carried out on patients under 16 years of age dying of tuberculous meningitis. From 1929–39, 21% of those under five years, and 5% of those from 5–15 years of age were probably of bovine origin, and from 1940–41, 46% of those under five were most likely bovine.

Although the results of this limited series show an increased incidence of tuberculous meningitis they do not indicate any important change from the pre-war ratio of bovine to human type infection.—J. O. L. K.

—. (1944). **Cheese carrying typhoid in Alberta?**—*Canad. Dairy Ice Cr. J.* **23.** No. 4. 40. **1904**

An outbreak of typhoid fever in Alberta was traced to cheese from a factory with a contaminated water supply.

Milk and whey are ideal media for the growth of bacteria which endure in cheese for long periods. In experiments by Campbell and Gibbard on the viability of *Salmonella typhi*, two infected cheeses were ripened for two weeks at 58–60°F., then one was kept at the same temperature and the other stored at 40–42°F. In the first the organisms were dead after three months but in the second they remained viable for six months and more. The size of the inocula used to infect the raw milk did not seem to be an important factor and there seemed to be no correlation between acidity and the viability of *S. typhi* in cheese. At the end of the experiment all cultures were tested for identity by serological and biological methods and were found to be in the smooth Vi phase. None of the strains had reverted to the rough or W form.—S. M. G.

PAUL, P., LOWE, B., & MCCLURG, B. R. (1944). **Changes in histological structure and palatability of beef during storage.**—*Food Res., Ill.* **9.** 221–233. **1905**

In order to obtain a better understanding of the factors causing increased palatability of beef by ripening, studies were made of histological changes during the onset and dissolution of *rigor mortis*. Rigor was shown histologically by the formation of dense nodes of contracture bordered on either side in the same fibres by areas of extreme stretch. It caused the formation of denser nodes than were produced by cooking beef

before its onset. Its dissolution and the subsequent ripening were marked by breaks in the fibres and by the appearance of areas of disintegration.

Storage tests showed that with small cuts of beef a nine-day period gives the greatest increase in palatability. Further storage produces undesirable odours and flavours. Beef hung as sides probably requires a longer period of storage to produce the same changes. —D. D. OGILVIE.

See also absts. **1762** (tularaemia), **1812** (parasites in sewage).

TECHNIQUE AND APPARATUS

BARTHOLOMEW, J. W., & UMBREIT, W. W. (1944). **Ribonucleic acid and the Gram stain.**—*J. Bact.* **48.** 567–578. **1906**

The authors followed the observation of HENRY & STACY [see *V. B.* **14.** 190] that the exposure of a heat-fixed smear of Gram-positive organisms to the action of 2% bile solution resulted in the loss of an outer surface layer of ribonucleic acid and conversion of the organisms to Gram-negative forms. They confirm that ribonucleic acid exists as magnesium ribonucleate in combination with the cell protein in the outer wall of Gram-positive organisms and is responsible for the specificity of Gram's stain.

If this ribonucleic acid is removed by bile salts, it will no longer unite with the cell protein if the latter has been oxidized by exposure to air. The recombination is possible, however, even on exposure to air, if the cell protein has been treated with formaldehyde. They show that the latter unites in low concentration with sulphydryl groups and prevents their auto-oxidation. The difference in size between Gram-positive and Gram-negative forms of the same organism is due to the rendering visible of the outer layer with Gram reagents. —JOHN G. CAMPBELL.

See also absts **1763**, **1764** (bacterial culture), **1771** (titration of *Cl. welchii*), **1801** (aggln. test with virus-coated bacterial suspensions), **1820** (diagnosis of thoracic diseases in horses), **1838** (blood-sugar estimation in cattle), **1843** (copper chloride crystallogram), **1853** (pregnancy diagnosis), **1913** (clinical diagnosis by laboratory examination).

MISCELLANEOUS

MACKINNON, M. N. (1945). **Some observations on Japanese animal treatment.**—*J. R. Army vet. Cps.* **16.** 155–156. **1907**

An account is given of Japanese methods of horse and mule management under active war service conditions. In the writer's experience, little attention is generally given to the animals. Mules and ponies falling into British hands have usually been in a deplorable condition, ungroomed and showing signs of mange, surra and other diseases. Japanese saddlery is usually unsatisfactory and rough improvisation is common. Unhusked rice fed on the ground is the staple diet. All animals were shod, but otherwise little attention is given to the feet.—D. D. OGILVIE.

FULLER, H. K. (1944). **Veterinary management of an artificial breeding circuit.**—*Cornell Vet.* **34.** 271–277. **1908**

This is a résumé of the events leading to the formation and subsequent organization of an artificial breeding circuit in New York State, U.S.A. Some details are given of the veterinarian's duties in this particular circuit.—N. J. SCORGIE.

REPORTS

GREAT BRITAIN. (1943). **University of London. The College of the Pharmaceutical Society of Great Britain. Annual report of research work. January 1942–June 1943.** [BERRY, H.] pp. 41. London: The College of the Pharmaceutical Society. 8vo. **1909**

The following are items of veterinary interest:—

Work in the Department of Nutrition included studies in the determination of vitamin A in liver oil, the relative needs of young male and female rats for this vitamin and the differences in calcification between the humerus and femur of young rats receiving high calcium, low calcium and stock diets.

In the Department of Pharmaceutics, studies were made of the bactericidal values of solutions of phenols in soap and the sterilization of sulphonamides. In the former, detailed examination of lysol showed that the bactericidal efficiency depended greatly on the quantity and type of soap used, and that standardization on creosol content alone, as at present, is unreliable. In sterilizing the sulphonamides, a temperature of 150°C. for one hour is required. This is suitable for sulphapyridine, sulphathiazole, sulphadiazine, etc. which do not melt until temperatures above 185°C. are reached. Sulphanilamide, however, melts at 163°–165°C. and special methods have had to be used for it.

Work in the Department of Pharmaceutical Chemistry has resulted in the placing on the market of two new acridine derivatives, 2 : 7-diaminoacridine and 5-amino-acridine. The former is the least toxic of the flavines yet produced and the latter, although more toxic, has the advantage of being non-staining. Observations have also been made on various isomers of stilboestrol and on soluble derivatives of chlorocresol.

Studies in the Department of Pharmacology on adrenal deficiency in rats showed that in this condition there is a significant increase in the histamine content of the whole body. Wild strains of digitalis were shown to have consistently higher degrees of activity than those from cultivated sources. The pharmacology of derivatives of pyrazolone was explored in an attempt to produce a reliable non-toxic analgesic. This work is being continued.—D. D. OGILVIE.

U.S.A. (1944). **Committee reports adopted at the eighty-first annual meeting [of the American Veterinary Medical Association], August 22-24, 1944.**—*J. Amer. vet. med. Ass.* **105.** 320–378. **1910**

The following are the chief items of interest:—

EDUCATION (pp. 320–321).—There are at present 2,057 students enrolled in the 10 American and two Canadian veterinary colleges. Some concern is expressed over the small number of graduates entering practice. It is hoped that next year a report will be made on the placement of graduates for the past 25–30 years.

LEGISLATION (pp. 321–323).—Reclassification of

federal veterinarians has been secured [see *V. B.* 15. 214]. Among other advantages the upgrading has resulted in an average increase of salary of about £100 for federal inspectors and about £300 for superintending inspectors.

Biological Products (pp. 323–324).—*Erysipelothrix rhusiopathiae* vaccine has been accepted for registration. It is recommended that it should be used only on premises where infection is well established and in conjunction with potent swine erysipelas antiserum.

Proprietory Pharmaceuticals (pp. 324–325).—A questionnaire sent to 500 veterinarians dealing with sulphanilamide and sulphathiazole yielded 185 replies. Most of these claimed that both drugs had a wide range of usefulness in horses, cattle, dogs and cats. It is advocated that the title of the committee should be changed to "Committee on Therapeutic Agents and Appliances", and that it should be in a position fully to evaluate new therapeutic agents and appliances.

Poultry (pp. 327–329).—For the first time for more than a decade and despite wartime difficulties, the national mortality rate for adult poultry has been reduced from 19·6 to 16·2%. Over 18 million chickens were pullorum tested, revealing 2·4% reactors, the lowest percentage on record although Pullorum Disease of chicks is still the most important disease of poultry in the U.S.A. Sulphaguanidine and sulphathiazole proved ineffective in the treatment of acute pullorum disease in turkeys. Research on Lymphomatosis indicated that it was probably transmitted through the egg. Transmission by contact was also demonstrated during the year. Experiments indicated that birds having access to food at all times were more resistant to Caecal Coccidiosis than those fed at intervals. Treatment with sulphamethazine had good results when the birds were confined in batteries.

Registry of Veterinary Pathology, Army Institute of Pathology (pp. 330–331).—Notice is given of the setting up of a registry of veterinary pathology at the Army Institute of Pathology, Washington. In addition to collecting pathological material, a diagnostic service for veterinarians is to be provided.

Vital Statistics (pp. 331–334).—Authentic data on the distribution, incidence, morbidity and mortality of animal diseases are lacking. A questionnaire has revealed that in all but four states there are regulations relative to reporting certain animal diseases, but in most states these regulations are not strictly enforced. It is recommended that in order to provide the necessary data, the Secretary of Agriculture should set up within the Bureau of Animal Industry a Division of Vital Statistics on Animal and Poultry Diseases.

Nomenclature of Diseases (p. 335).—A scheme for cataloguing diseases of animals is detailed.

Rabies (p. 335).—The use of prophylactic vaccination is recommended. A vaccine of increased potency and uniformity is now available.

Food Hygiene (pp. 336–339).—In 1943 the number of abattoirs operating under Federal inspection increased to more than 400. Meat production in 1944 was expected to be greater than in any other previous year and was forecast at 100 million pigs and over 17 million cattle. Of this 74% of the pork, 72% of the beef, 51% of the veal and 88% of the lamb was expected to receive Federal inspection. Efforts to extend inspection by veterinarians to the remainder are discussed.

Brucellosis (pp. 339–341).—During 1943 the agglutination test for brucellosis was applied to 5,185,228 cattle. Many of these were re-tests. There was a tendency to exchange test and slaughter methods in favour of calfhood vaccination. Approximately 556,000 calves have been vaccinated under official supervision since January, 1941. The production of vaccine, excluding that prepared by the Bureau of Animal Industry, has increased from 1,525,000 doses in 1941 to 2,359,000 doses in 1943. Vaccination of adult cattle is being increasingly employed. The intradermal injection of strain 19 vaccine is at present being tested in a few herds; little is known concerning its virulence for man. Although it is recognized that in calves the organism does not establish itself in the udder it is not known whether this is so in adult cattle. Some concern is expressed regarding the possible danger to public health from this source.

Swine brucellosis is now recognized as one of the important diseases of animals transmissible to man, and research upon it has been intensified.

Diseases of Dairy Cattle (pp. 342–346).—It is established that during the year breeding associations in New Jersey, New York and Winconsin artificially inseminated between 90,000 and 100,000 dairy cattle. Granular Vaginitis is common in dairy cattle of all ages. Treatment with silver picrate, bismuth formic iodide or sulphanilamide powder is widely used but is not fully effective. More research is necessary. For simple Calf Scours, losses are reduced to a minimum by prompt use of sulphaguanidine. When the diarrhoea is accompanied by severe febrile or pneumonic symptoms, sulphapyridine or sulphathiazole in 1 g. doses may be used in conjunction with sulphaguanidine. Both Psoroptic and Sarcoptic Mange in dairy cattle have increased greatly in recent years. Psoroptic mange can readily be cured by a few lime-sulphur applications, but sarcoptic mange is more resistant and more prolonged treatment is necessary. Cattle Lice are a serious problem and last winter there were many severe cases in young cattle where death resulted. Warbles in cattle, according to the U.S. Department of Agriculture, cause losses of 50–100 million dollars annually in damaged hides alone. Some 40% of all hides are affected. Internal parasites of cattle are not a serious problem except for sporadic outbreaks. Coccidiosis and Parasitic Gastritis are of most importance, with Lungworms of lesser significance.

Diseases of Beef Cattle (pp. 346–349).—Vitamin A Deficiency in young cattle in the winter is becoming more prevalent under wartime conditions. Anaplasmosis is rapidly becoming a national problem and is spreading each year to new territory. Slaughter and the use of hygienic precautions are the only methods of control at present available. The indiscriminate use of Strain 19 vaccine in cattle is widespread and is reported from some quarters to have caused abortion in pregnant animals. The situation is regarded with some disquiet.

Diseases of Sheep (pp. 349–350).—In general, parasitic diseases of sheep are now well controlled although far from eliminated. Fully effective agents are still required against Lungworms, Tapeworms, and Flukes. Infectious diseases of sheep are mostly regional in distribution and the majority can be controlled by immunization or by hygienic precautions.

Diseases of Swine (pp. 350–353).—Swine Fever is still the most important single cause of loss in swine and better means of control are required. Erysipelas has increased in incidence during recent years. Influenza still occurs widely; no specific preventive or control measures are available. Brucellosis is also fairly widespread, and Pox is sometimes of considerable importance, the control of pig lice helping to prevent its spread. Icteroanaemia, a disease of unknown aetiology, characterized by anaemia, jaundice and marked enlargement of the spleen, is causing considerable losses in some herds. Deforming Rhinitis has

occurred on a limited scale for several years and may be increasing in incidence. MANGE is undoubtedly more important now than formerly and the adoption of effective control measures is imperative.

DISEASES OF HORSES (pp. 353–354).—The need for more research on EQUINE BRUCELLOSIS and a number of other diseases such as PERIODIC OPHTHALMIA, LAMINITIS and MYOGLOBINURIA PARALYTICA is stressed. A disease of endemic proportions in mules occurring subsequent to long rail journeys and characterized by fatigue, fever, and watery diarrhoea is described; the aetiology is unknown and here also research is required.

DISEASES OF SMALL ANIMALS (pp. 354–356).—The danger of dogs returning with the Army from foreign countries and introducing new parasites is discussed and SURRA, LEISHMANIASIS and OROYA FEVER are discussed from this viewpoint; as a control measure the U.S. Army has prohibited the transportation of dogs or other pets to the U.S.A. on Army aircraft. The lack of adequate research on small animal diseases is deplored.

DISEASES OF WILD ANIMALS IN CAPTIVITY (p. 356).—Recent investigations indicate that increasing numbers of wild species serve as reservoirs of infections transmissible to domestic stock and human subjects. Here again research is required.

MOTION PICTURE LIBRARY (pp. 357–358).—The results are given of an investigation to determine the desirability and practicability of establishing an Association film library. The investigation was conducted by means of questionnaires sent to veterinary colleges, state associations and other bodies and revealed universal enthusiasm for the project. There was unanimous agreement that the Association should maintain such a library and indications were given that the state associations and other groups including the U.S. Livestock Sanitary Association, U.S. Army Veterinary Corps and veterinary colleges would use its services. The replies to the questionnaires are dealt with in detail.

POST-WAR PLANNING (pp. 358–366).—Among many other items the place of the veterinarian in the post-war public health service is discussed. The authorities are agreed that 12 veterinarians should be appointed as soon as possible to assist the 12 districts into which the U.S.A. and its possessions overseas are divided. Their chief duties will relate to the sanitation of food products and work on the epidemiology of human diseases thought to have animal reservoirs.

COMMITTEE ON FOODS (pp. 370–371).—During the course of tests on various commercial dog foods, dogs have frequently been kept exclusively on the same brands of food for periods of up to eight months. There have been no untoward results. During the year the War Food Administration terminated Food Distribution Order 58 regulating the production and distribution of dog foods; producers are now permitted to return to pre-war formulae, provided they can obtain the necessary ingredients.

NATIONAL FORMULARY COMMITTEE (pp. 371–372).—Several items of veterinary interest have been added to new monographs which in due course will appear in National Formulary VIII. Among these are barium chloride, rotenone, and pine oil. Of the monographs official in N.F. VII which will be omitted from N.F. VIII, only one is of veterinary interest, *viz*, croton oil. Metric doses are to be given greater prominence in N.F. VIII than previously. N.F. VIII is expected to be ready late in 1945, and to become official in July, 1946.

VETERINARY MEDICINE PROCUREMENT AND ASSIGNMENT SERVICE, WAR MANPOWER COMMISSION (pp. 372–373).—The negotiations which have proceeded for several years in an attempt to ensure that veterinarians received equitable treatment by the War Manpower Commission are detailed. Concern is expressed regarding the future man-power position within the profession, approximately one-third of young veterinarians having been inducted to war service.

REPRESENTATIVE TO THE HORSE AND MULE ASSOCIATION OF AMERICA (p. 374).—There are still 12 million horses and mules in the U.S.A. and these have played an important part in the war effort. War shortages, however, have made breeding very difficult and there is a growing shortage of young stock.

REPRESENTATIVE TO INTER-ASSOCIATION COUNCIL ON ANIMAL DISEASE AND PRODUCTION (pp. 375–376).—According to the 1940 census, the annual value of livestock and livestock products sold or traded was over 3,500 million dollars and the value of mature animals on hand exceeded 4,500 million dollars. Animal disease causes enormous losses. It is reported that there is lost annually from all causes, one-third of the pig crop, one-fifth of the dairy calves and one-quarter of the pullets put into laying houses and that four colts must be born to produce two work horses. Diseases specially requiring attention and which are not yet the subject of unified state and Federal effort include BOVINE MASTITIS, RABIES and BOVINE TRICHOMONIASIS. Detailed suggestions are given for increasing efficiency in disease control and research, for improving the public information service and for the training of animal scientists.

REPRESENTATIVE TO NATIONAL LIVESTOCK CONSERVATION PROGRAMME (pp. 376–377).—The Programme was organized to assist in the animal food production effort by correlating and popularizing scientific information and making it available to the livestock industry. With this object in view numerous meetings of farmers and other livestock producers have been addressed and many posters, leaflets and publications produced.

REPRESENTATIVE TO NATIONAL POULTRY ADVISORY COUNCIL (p. 377).—The effectiveness of the programmes developed by the Council is shown by the fact that for the first time there is a reduction in poultry mortality. Further emphasis is given by the publication of production figures showing that in the first quarter of the year 130 million dozen eggs above the target level were produced.—D. D. OGILVIE.

U.S.A. CONNECTICUT. (1943). **Connecticut State Entomologist. Forty-Second Report, 1942.** [FRIEND, R. B.]—*Bull. Conn. agric. Exp. Sta.* No. 472. pp. 207–315. Items of veterinary interest pp. 228–231. **1911**

A summary is included of work on the development of various repellents for protecting trees and shrubs against the cottontail rabbits, *Sylvilagus transitionalis* and *S. floridanus mallurus*. Asphalt emulsions containing ethylene dichloride, copper carbonate, and dry lime-sulphur were among the most effective preparations. The tests were made on penned rabbits, and the repellent properties can be gauged from the fact that the rabbits were sometimes reduced to feeding on species of trees which are never damaged under wild conditions. Experiments were also conducted in order to discover suitable adhesives for use with the repellents.—J. B. C.

—. (1943). Fonctionnement des laboratoires et centres séro-vaccinogènes en 1942. [**Work of the laboratories and sero-vaccination centres in French West Africa, 1942.**]—*Bull. Serv. zootech. Epiz. A.O.F.* **6.** Nos. 1, 2, 3 & 4. 115–142. **1912**

An account is given of the biological products manufactured in the various laboratories of French West Africa, the research work carried out, and the results of the examination of specimens received.

The greatest demand for biological products

appears to have been for rinderpest serum and vaccine, anthrax vaccine, and culture-vaccine for bovine contagious pleuro-pneumonia.

One specimen of *Babesia bovis* is recorded from Senegal, but this requires confirmation. Four positive smears of canine leishmaniasis are recorded from the Dakar laboratory which also records that *Trypanosoma vivax* has been successfully inoculated into rats, g. pigs and monkeys. [Except for rare infections in rabbits, it has not hitherto been possible to establish this trypanosome in experimental animals.] Investigations are recorded on *Rickettsia ovis* which is considered to cause a severe and even fatal disease of sheep.—U. F. R.

See also abst. **1767** (bovine brucellosis in Norway).

BOOK REVIEWS

KOLMER, J. A. [M.S., M.D., Dr.P.H., Sc.D., LL.D., L.H.D., F.A.C.P., Professor of Medicine, Temple University; Director of the Research Institute of Cutaneous Medicine; Formerly Professor of Pathology and Bacteriology, the University of Pennsylvania.] (1944). **Clinical diagnosis by laboratory examinations.** pp. xlii + 1,239. 73 figs. New York & London: D. Appleton-Century Company, Inc. 1st edit. revised. 4to. **1913**

In this revised first edition (third printing) a number of changes and corrections have been introduced. About three-quarters of the book deals with the clinical interpretation of laboratory examinations and their practical application and the last section describes the technique of the more commonly used clinical methods.

A valuable introduction gives an excellent account of the scope and importance of clinical methods. Diagnosis made in the laboratory is just as much clinical as that made at the bedside and the word "clinical" describes not the place where the examination is made but the purpose in view in making it. The art of medicine is not separate and distinct from its science and laboratory methods are often essential in arriving at an accurate diagnosis as the basis for proper and intelligent therapy. The clinical pathologist should not spend his whole time in the laboratory conducting tests: these can be done equally well by experienced technologists. Every practising physician and surgeon should be a clinical pathologist in a broad sense and be able to interpret the results of laboratory examinations.

Part I (the clinical interpretation of laboratory examinations) and Part II (its practical applications) are made yet more useful by the inclusion of 137 tabular summaries on such subjects as abnormalities of urine, faeces, and cerebrospinal fluid. There are references at the end of each chapter. Part III (technique) gives sufficient detail to enable the tests described to be carried out without further help. A new addition is the copper sulphate method for determining the specific gravity of whole blood and plasma with three or four drops of blood; nomograms enable the haemoglobin content and plasma proteins to be determined: the whole procedure takes only a few minutes and can be conducted at the bedside.

There is a good index of 170 pages. A number of diagrams illustrate apparatus and technical procedures. [Figs. 51 and 52, which explain the making of blood smears, show films extending right to the edge of the slide although it is stated in the text (p. 974) that the film should not reach the edge or end of the slide.] The plates illustrating abnormalities of the blood picture suffer from being in black and white: colour plates would greatly increase the value of this chapter.

This book can confidently be recommended to veterinarians concerned with clinical diagnosis; this applies particularly to Parts I and II which contain information difficult to obtain from any other single work. When it is possible to obtain such a book as this dealing with clinical laboratory methods in veterinary medicine, the profession will indeed be well equipped for accurate diagnosis.—E. G. WHITE.

BLOOR, W. R. [Professor of Biochemistry and Pharmacology, The University of Rochester, New York.] (1943). **Biochemistry of the fatty acids and their compounds, the lipids. American Chemical Society Monograph Series.** pp. xi + 387. 42 tables. New York: Reinhold Publishing Corporation. 8vo. $6.00. **1914**

This book is an authoritative account of the subject by a leading worker for thirty years on the biochemistry of fats. As the title indicates, it deals with the biochemistry of lipoids rather than with the chemistry of their structure. The first chapter gives an account of the chemical properties of fatty substances and the determination of them in tissues. Other chapters deal with digestion and absorption, lipoids of the blood, lipoids in tissue, lipoid metabolism and lipoids of secretions. Each chapter has an extensive bibliography and the matter is clearly presented. This book replaces the monograph on fats by LEATHES & RAPER, the last edition of which was published in 1925. The new monograph should be available for reference in all biochemical laboratories.—E. BOYLAND.

BULL, H. B. [Ph.D., Associate Professor of Physiological Chemistry, Medical School of Northwestern University.] (1943). **Physical biochemistry.**—pp. iv + 347. Numerous figs. New York: John Wiley & Sons; London: Chapman & Hall, Ltd. 8vo. $3.75. **1915**

This book is the outcome of a series of lectures on physical chemistry as applied to living systems, given by the author to graduate students in biochemistry, physiology, bacteriology and neurology, and to medical students. Physical chemistry now overlaps so many aspects of biology that the curriculum of the biologist in the near future may well include physical biochemistry as a major subject in his training. Nevertheless, without a fair background of higher mathematics the student may find the subject rather unintelligible to him, and for that reason alone the average reader may find some difficulty in mastering the contents of the present volume. That difficulty is somewhat increased in this book by the vastness of the field the author has attempted to cover, for, as he admits in the preface, the present treatment is essentially that of an outline course which leaves the reader to fill in the details by consulting the copious references to original literature cited in the text.

Aspects of the subject covered in individual chapters are:– atoms and molecules; energetics; reaction kinetics; electrostatics and dielectrics; ions in solution; E.M.F. cells; acids and bases; oxidation-reduction; electrical conductance; electrokinetics; surface activity; colloidal solutions; viscocity and the flow of liquids; diffusion; the ultracentrifuge; osmotic pressure; membranes and cell penetration; and colloidal structures.

The book should serve a useful purpose to those whose work brings them into close contact with physico-chemical aspects of biological problems.—A. EDEN.

See also abst. **1806** (Mallophaga of domestic animals in the U.S.S.R.)

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